The Builder.

No. CCCXCV.

SATURDAY, AUGUST 31, 1850.

IN accordance with the promise last week, in our notice of the meeting of the Archæological Association at Manchester,* we give an elevation and plan of a large warehouse now being erected near the infirmary in that city, under the direction of Mr. J. E. Gregan; not simply for itself, but as an example of the class of buildings with which the streets of that extraordinary city are being lined.† This warehouse is to be occupied by a firm extensively engaged in the American trade, and the interior arrangements are made with a view to suit their particular branch of Manchester business. For example, one of the upper stories contains a series of counting-houses, for the private use of the American merchants when in Manchester to make their purchases. The building is not fireproof, the floors being constructed with timber beams 14 in. by 10 in., laid from 7 to 8 feet apart, on which lie 3-inch planks, grooved, and tongued with strong hoop iron, forming the floor of the room over, and the ceiling of the room under. The beams are supported by iron columns over and resting upon each other. There is a cartway through the building (from side to side), under the apartments marked "Waiting office," and "Sale and sample rooms." The well, covered with glass roof, over part of this cartway, is for loading and unloading from the several stories.

There are hydraulic packing presses, worked by a steam-engine in the cellar, which also supplies power for working a fireproof hoist, and the teagles for loading and unloading the waggons in the cartway. The exterior is cased with Yorkshire stone: the walling tooled, and the dressings polished: the windows will be filled with plate glass.

The large quantity of light required in a warehouse of this description, demands a great number of windows, and they are necessarily very close to each other, as the distance from centre to centre of the piers is regulated by the position of the floor-beams. This arrangement destroys much of the breadth of effect desirable in a building of such large dimensions; and an attempt has been made in the structure before us to recover this quality, as much as possible, by only dressing the alternate windows. The effect of the building in execution is superior to that of the engraving. The whole cost will be about 8,000*l*.

No one should go to Manchester without seeing the process of cotton-printing, albeit in parts a sloppy operation, at which fine folks turn up their noses. At Hoyle's "Mayfield Print Works" there is a school for children, dwellings for the workpeople, and extensive buildings for the various steps in the process. In the first apartment you see girls (with strong magnifying glass), engraving the patterns on copper rollers; then the presses furnished with these rollers, at work, moved by two steam-engines of 25 horse-power each, which also do all the other work of the establishment; further on you have drying-rooms, fitted up with cases filled with steam, over which the printed calico passes, and where the temperature is higher than is agreeable in August; and then you come to an enormous apartment, perhaps 120 feet long, 45 feet wide and 75 feet high, called the ageing place, where the printed stuff is exposed, hanging from the top in its whole length, to the oxygen of the atmosphere. Each piece, we should say, is dyed after the printing. It is afterwards washed in one steam-turned cylinder, and then put into another which makes 800 revolutions in a minute and so whirls it dry in something less than no time.* There are other processes, such as de-oxygenating the blue cloth to make a green, and numberless contrivances to lessen labour, such as an inclined plane from the upper stories to the ground-floor (a sort of "Russian mountain") down which the little urchins of boys come rattling at dinner time with the rapidity of "greased lightning;" but we may not stop to describe them. An enormous volume of patterns lying in the designer's room, the produce of *one* French house for *one* season, would form a text, too, for an instructive commentary, but we must abstain. One important result of the approaching international exhibition, will be, that we shall see where we are inferior to other nations, and learn what we have to strive for.

Houldsworth's Embroidery Establishment is another feature of Manchester. About 250 persons are employed there, mostly young girls and children, and very exquisite works are produced. It is to be hoped that means are afforded to these poor children to obtain instruction, although, as they work from six to six, there would seem to be little opportunity excepting at the Sunday school.

Before returning to the business of the meeting we looked in at the "Exhibition of the Works of Modern Artists" in the Royal Manchester Institution, which comprises 571 works. It includes naturally many works previously exhibited in London, amongst others by O'Neil, T. F. Marshall, Wingfield, Creswick, M'Innes, Boddington, J. E. Lauder, Anthony, R. Ansdell, &c. The Heywood medal has been awarded to a picture by a name unknown to us—Thomas Faed, called "Jeannie Deans and the Duke of Argyle." It is a promising work, but the female figure is not Scott's Jeannie. In the water colour department, the medal has been given to F. M. Richardson, for No. 463, "Falls of the Tummell, Perthshire." There is an admirable "Portrait of a Lady," No. 111, by Hermann Kretzschmer; and two sisters, Miss Mutrie and Miss A. Mutrie, exhibit representations of fruit and flowers which deserve high commendation: No. 117, pine apple, grapes, &c. by the latter, is especially excellent.

The excursion made by the association to Lancaster was most successful: the kindness of many of the inhabitants and the beauty of the places visited will not soon be forgotten by those who had the good fortune to go there.† Whalley Abbey, which was visited, on the road to Lancaster, has many features of interest. The Rev. Mr. Whittaker, son of the writer of the excellent "History of Whalley," acted as guide. The remains here are of the fourteenth and fifteenth centuries: the abbey gateway is of great size, and, together with the north-east gateway, of striking proportions. The principal ornamental feature remaining is the entrance to the chapter-house, a work of the Perpendicular period.

Whalley Church, close by, has a very interesting Early English chancel, with an effective memorial window at the east end by Messrs. Pugin and Hardman. A chapel here, enclosed with screenwork, carved by Etough, carver to Whalley Abbey, in 1510, was known as St. Mary's and St. Nicholas's *Kage*, one of the few instances of the application of this word to chantry chapels. A pew here, belonging to the Towneley family, was anciently called "St. Anton's Kage." In the churchyard are the remains of three curious crosses, probably antecedent to the Conquest. Pasley, the last Abbot of Whalley, executed in the time of Henry VIII., lies in the church. In expectation of the visit of the association, Mr. R. Moffatt Smith published a series of views of the antiquities at Whalley and Ribchester, which the members will find a pleasant reminder of the visit.*

Ribchester Church, also, has an Early English chancel, with triplet window at east end. The south porch has a room in the upper part, and stands higher than the aisle to which it is attached. Ribchester was an important Roman station, and will yield up evidence of this, at any time, on the application of a spade, with knowledge. Excavations had been made under the direction of the president of the Association, and the results, in the shape of Samian ware, glass, bones, coins, &c., were considerable. On the return to Manchester, Mr. Just and Mr. Harland, of the *Manchester Guardian*, read a very valuable joint paper on the Roman remains, roads, &c., in Ribchester.†

At Stidd, near Ribchester, is a small chapel of Norman structure (there is little architecture of this period remaining in the county); and here too, is an old house occupied by four families, which seemed to us worth illustrating.‡ Each occupant has a separate entrance, and architectural character is given to the building by an external central flight of steps to the upper floor, with large arcaded porch.

The journey to Furness Abbey, to which a whole day (Wednesday, the 21st) was devoted, was a long one, and required two railways, omnibuses, and a steamboat, each way. But fine views, fresh air, a large party, including

* See p. 397, *ante*.
† See p. 414.

* 5lbs. of water are taken out of a piece of stuff by this machine in eight minutes.

† In addition to the papers read at Lancaster, which we mentioned last week, may be named one by Dr. James Johnson, on the "History of Ancient Lancaster," and another on the "Antiquities of Furness," by Mr. Haggard.

* Six Views of Architectural Antiquities in Whalley and Ribchester. By R. Moffat Smith, Architect. 13, Dickinson-street, Manchester.

† The following is a portion of it:—It is clear that Coccium was an important place under Roman sway, possessing privileges and governed by laws unknown to the other stations on the same line of military road. It is hence to be presumed that it should exhibit a greater extent of area, and richer and more numerous remains than any other station in Antonine's 10th Iter. According to the admeasurement of the ordnance survey, the rectangle marked out by the agger, where stood the ramparts of the station, included about ten statute acres. This area is larger than that of Mancunium to the south, or than those of Bremetonacæ, Galacum, &c. to the north. As to remains,—pillars and shafts of columns belonging to a Roman temple, baths, a helmet, altars, and other inscribed stones, coins, pottery, &c.,—show that in comparison with such remains on the other stations of the line, Ribchester stands as pre-eminent as its ancient importance might lead us to expect. Leland, however, about the middle of the 16th century, found it "but a poor thing." Camden describes it as a rich mine of antiquities, and copies with more or less accuracy five inscriptions. Succeeding antiquaries, including Dr. Leigh, Dr. Stukeley, Horseley, Gale, Dr. Whittaker, the historian of Whalley, add their discoveries, especially the great discovery of the bronze helmet and other antiquities, in 1796; the discoveries of remains of the Temple of Minerva, in 1811 and 1813; and the subsequent discoveries of stones, pottery, coins, &c. all combining to accumulate a treasure of interesting antiquities, which, it is lamentable to add, for want of some local or county museum, like those at Newcastle-on-Tyne and York, have been either lost or scattered, till little now remains of these extraordinary proofs of the Roman power in this part of the kingdom. One solitary inscribed altar is at the vicarage at Ribchester, with a few coins, a fibula, a bulla, and some fragments of Samian ware, and of coarser pottery; two altars are within the precincts of St. John's College, Cambridge; one is at the catholic college of Stonyhurst, in this county; some remains are at T. D. Whitaker's, Esq., the Holme, near Burnley; and for the rest, they are scattered in various parts of the kingdom, including Preston, Rochdale, Chester, Tabley Hall, Yorkshire, &c. The British Museum contains those formerly in the Towneley Museum.

‡ See page 415.

some of the big-eyed Lancashire witches, and one of the finest ruins in England, amply justified it. The site of Furness Abbey is one of those delicious valleys which the Cistercians always selected for their buildings: the ruins are very extensive, and belong mainly to the latter part of the twelfth century, when the pointed arch was being incorporated with the semi-circular. They occupy a space of ground 600 feet in length by about 400 feet in width, and the grounds enclosed to the monastery altogether were 65 acres. Standing in the centre of the quadrangle, a regular square, with sides of some 180 or 190 feet each in length, you have on the north side the conventual church, a building of extraordinary proportions, with its tower, chancel, transepts, and choir 306 feet in length, the width of the church across the transepts being 190 feet. On the east side of the quadrangle was the refectory, about 200 feet long; the chapter-house and common refectory, with dormitories above (upwards of 200 feet in length); and on the west a magnificent hall, stretching from the chancel of the church to the utmost limits of the southern building (being, in fact, nearly 300 feet in length), which may have served as the hospitium or guests' hall. There was also a long suite of buildings farther south of all these, at right angles, and covering them from east to west, the exact purpose of which has not been determined, though one was apparently a small chapel (the abbot's chapel), and another the hospital.

There are some very interesting early stone effigies scattered about, on which Mr. Planché discoursed pleasantly.

The society here had the advantage of Mr. E. Sharpe's guidance, as well as of an excellent paper from him on the subject, a condensation of which we shall print hereafter.

The Chapter-house is a singularly fine Early English apartment: one of the windows, left unfinished, shows the several steps in working the dog-tooth moulding. The sedilia in the chancel of church, a Perpendicular insertion, are remarkably large and fine.

We must back, however, to Lancaster, where, on Thursday morning, the members were publicly entertained by the inhabitants. A hundred people breakfasted and nine speeches were made in five-and-forty minutes; and then they rushed out to see a bit of the town before starting for Hornby Castle. The castle at Lancaster, as every one knows, is now a prison, and shows little of the old work but the keep. The law courts in it were designed by Gandy. Lancaster church, a building of the Perpendicular period, possesses some extraordinary wood-work of the previous style, in the shape of reredos and stalls, now against the east wall. The history of this wood-work, of which there was formerly much more, is unknown: tradition says it came from abroad. The reredos is especially beautiful. The east window is filled with stained glass: the subject is the Crucifixion, one of the best of Wailes's works. The church is lumbered up with galleries, but it may be hoped that these will not long be suffered to remain. A new font, well designed by Messrs. Sharpe and Paley, was put up in 1848, in connection with a small brass tablet, as a memorial of John Stout, Esq., of Lancaster, in lieu of an ordinary monument. It is octagon in form; stands on two steps, and has figures of the Evangelists in the pedestal.

Hornby Castle, illustrated in our last number, has been recently restored by Messrs. Sharpe and Paley, in good taste. It cost the present possessor, Mr. Pudsey Dawson, twenty years' fighting in law courts, and many thousands of pounds, before he could obtain possession of it, under a disputed will. After a most hospitable and elegant entertainment here, the migratory body (literally *swallows* a little while before) once more started for Manchester, where papers were read on "Ancient Etymologies," by Rev. Dr. Whittaker, of Blackburn; on "The Discoveries at Lymne in Kent," by Mr. Thomas Wright; on "The Traces of the Romans along the banks of the Mersey," by Mr. W. Beamont; Mr. Jas. Thompson on the Roman wall at Leicester; on "Œolophiles," by Dr. Bell, &c. &c., (to some of which we shall refer); a public dinner was eaten; a thanksgiving and wind-up meeting held on the Saturday, and then the members evanished to their several homes, having spent a pleasant, instructive, and useful week.

We must not omit to add that at the closing meeting on Saturday it was resolved, "that, with a view to the advancement of archæological science and the formation of a central museum of British antiquities, it is desirable to promote a union between the British Archæological Association and the Archæological Institute of Great Britain and Ireland; and that this meeting strongly recommends the council to take such steps as to them may seem expedient to accomplish these important objects." We sincerely hope that the Institute will evince a corresponding good feeling, and that the endeavour will prove successful.

THE STRUCTURE OF THE NORMAN FORTRESS IN ENGLAND.*

THE Norman castle did not consist of a single building, such as in modern times we often understand by the term, but of a *series* of fortified erections. The keep, which we now frequently designate the castle, was but a part of the stronghold, and was the resort of the garrison only in times of pressing danger. The castle consisted of the central building, or keep, the upper and lower courts, or baileys, in which were the garrison buildings, with the walls, gates, barbicans, and ditches, intended to promote the general safety. The area occupied by a castle was often very considerable. Norwich Castle covered a space of not less than twenty-three acres. The site chosen for it was usually an elevated spot of ground naturally defended on two or more sides. Excepting in situations where the ground was very precipitous, a ditch was drawn around the enclosure. When the nature of the level would admit of it, the moat was filled with water. On the inside of the ditch a strong wall was raised. This was sometimes thirty feet high, and had a thickness of six or eight feet. On the top of it was a platform, protected by a buttress, for the evolutions of the garrison who manned the fort. The curtain wall of the Norman fortress of Richmond is in a nearly perfect state. Its masonry is of a rougher character than the keep, a large portion of the facing stones being undressed. The erection of it has evidently been the first care of the garrison, as the buildings, which have been placed against its inner margin, have not been tied into it. One or more gateways of course gave access through the wall to the interior space, each of which was defended by a tower and other appliances. The drawbridge and the portcullis belong rather to the Edwardian than the Norman castle, yet examples of them are met with at this period. When the foe attacked the fort the ditch had to be filled up with hurdles or earth before the gate could be reached, and when it was, the uplifted drawbridge formed an additional barrier. In addition to the tower defending a principal gateway, a barbican or advanced work was occasionally added. This was sometimes furnished with a ditch and drawbridge. Besides the principal entrance into the castle, other apertures, which convenience dictated, were provided. These were often very narrow, and were placed in situations so precipitous as to be easily defended. Not unfrequently two or even three walls, each of them provided with a moat, surrounded the fortress. Where concentric walls did not form independent inclosures, a wall was drawn across the general space, dividing it into two courts, called the inner and outer bailey. This enabled the garrison, in case of the outer court being taken, to retreat into the inner. Immediately within the outer walls of the castle, the garrison buildings seem to have been placed. These consisted of the residences of the several officers, a common hall, a place of abode for the soldiery, stables for the horses, and a chapel for the use of the garrison. At Richmond most of these yet remain. The general character of them is dark, gloomy, and comfortless, bearing more of the appearance of dungeons than of the abode of conquerors. We now come to the most remarkable part of the fortress—the keep. This was the retreat of the garrison in the event of the outer and inner baileys being carried by the enemy, and on it, accordingly, the utmost skill of the military architect was lavished. It was generally placed in the centre of the fortification, though this was not universally the case. When circumstances allowed of it, it was placed upon a site more elevated than the rest of the fortress. If the ground did not naturally assume the required form, a forced mount was prepared of the materials taken out of the moats. Clifford's Tower at York is so placed. The general form of the Norman keep is that of a quadrilateral figure, nearly approaching to a square. The great thickness of its walls, and the strength of its masonry, almost superseded the use of buttresses. In buildings of the larger class a smaller tower is attached to the main structure in order to defend the entrance. The cautious policy of the Normans suggested that the door-way of the keep should not be on the ground-floor, but at a considerable elevation. It is generally placed upon the second story. By this means the lower parts of the building, which were more exposed to the battering-rams of the besieging party than the higher, were kept in unimpaired strength, and the attacking party, before reaching the entrance, had to climb a steep staircase, exposed, meanwhile, to the fire of the garrison. In small buildings the entrance stair is left uncovered, but in large fortresses it is uniformly protected by a tower attached to the keep, but still entirely independent of it. The whole of this subsidiary building might be in the hand of the enemy, while the integrity of the citadel remained unimpaired. The masonry of the keep was of the most formidable character imaginable. At Newcastle there is reason to believe that the whole area of the site has been built up solid from a depth of about fourteen feet to the surface of the ground. The thickness of the walls is in most cases enormous. Twelve and fourteen feet is a common thickness; but there are cases, as at Colchester, where they are thirty feet thick at the bottom. They generally taper off in stages, so as to give to the upper apartments increasing size. The stones employed in building these walls are uniformly of excellent quality, and were not unfrequently brought from a considerable distance. They were not usually of a size larger than could be conveniently lifted by a man, and were for the most part square in the face. The *face* of the wall only consisted of regularly squared stones: the interior was composed of grout. The strength of the whole structure chiefly depended upon the character of the mortar employed. In making it the Roman method was adopted. It was poured in a sort of semi-fluid state into its bed, loose rubble being thrust in amongst it: in the course of a few hours the mortar would become solid, and in a few days the wall would present to an enemy a breastwork capable of resisting a battering-ram. Nothing can exceed the firmness of Norman masonry; it is, if possible, harder than unhewn rock. Recently it was necessary to breach the walls of the White Tower, in London, in order to introduce a tram way into it for the conveyance of ordnance stores, and it took a party of sappers and miners six weeks to effect their purpose. The same policy which suggested that, excepting on very rare occasions, no doorway should exist on the ground-floor, required the very sparing introduction of windows. In some instances, as at Richmond, there are none on the ground-floor. The room has depended entirely upon artificial light: the staples fixed in the centre of the vaulting show the places where the lamps have hung. Where windows are introduced, they are of the smallest possible size, being little better than arrow loops. The light which was admitted through the aperture was carefully economised by the increasing width of the window as it approached the inner margin of the wall, and by this means the precious rays were allowed freely to expand themselves. As these holes served the purpose of arrow loops as well as windows, the bottoms of them were generally formed into steps, and on their upper margin was not unfrequently a recess provided to protect the head of the soldier, who stood at it watching his opportunity to project the deadly bolt. In order to defend the garrison within the keep from the action of missiles thrown through these apertures, an ingenious contrivance may often be noticed; the upper portion of the window aperture is made to curve downwards as it approaches the inner margin of the wall, or a stone curtain drops directly down, and against these projections an arrow sent from below would necessarily strike and

* Read at Manchester, by the Rev. J. C. Bruce, of Newcastle-upon-Tyne.

drop harmlessly down. The grand entrance, which is usually placed on the south side, is the member of the fortification on which the builder has chiefly displayed his artistic skill. Some of them are very beautiful. They of course exhibit the semicircular arch of the Norman style and the characteristic zig-zag ornament. The windows of the building, when windows are admitted as they usually are on the second and third stories—especially on the side least exposed to the enemy—are generally comparatively small and nearly devoid of ornament. The internal arrangements of the keep may now obtain our attention. In the large buildings the interior area is divided into two or three compartments by stone walls rising from the ground to the summit of the building. The object of this arrangement has been, not so much its economical convenience as its military advantages. In the event of one compartment of the castle being got possession of by an enemy, the other might be successfully held out against them by closing the gates of communication. From the top to the bottom of the building a newel staircase usually ran. In the lower part of the building this was the only means of communication with the several stories, for the builders have evidently contemplated the possibility of an enemy getting possession of the ground-floor, and yet being kept at bay. In the upper part of the building, where the same reason could not exist, greater freedom of communication is enjoyed, and two or more staircases exist. The structure of the newel staircase is curious; it is turned round a central pillar, and is vaulted above. The erection of this spiral vaulting must have been a work of some difficulty. Another essential requisite in a Norman keep was the well. Without it no garrison could maintain a siege. In many cases the labour involved in sinking it was very great. At Carisbrook Castle, in the Isle of Wight, the well is said to have been 300 feet deep. At Bamborough Castle the well is sunk to the depth of 145 feet, through a whinstone rock. It was not sufficient, however, that a well was provided, to which access might be had in the basement story—the comfort of the garrison required that it should be easily accessible from the higher parts of the building. At Rochester the pipe of the well is continued from the ground to the highest floor of the building: an arched opening communicates with each story. At Newcastle a contrivance is adopted which is probably peculiar to this keep. The well is only accessible from the third story, the pipe enclosing it being continued up to this elevation without there being any intermediate opening in its solid masonry. The builders have evidently contemplated the possibility of the lower portions of the building being in the possession of the assailants without the garrison being obliged to surrender. This precaution, however, not only involved the labour of raising every bucket of water that was wanted for any part of the castle to this elevation, but the additional labour of carrying to the apartments below what was required there. To remedy, in part, this inconvenience, pipes have been laid in the walls and pillars of the building from the well-room to the lower parts of the structure. Some portions of them yet remain. In castles of a moderate size, the principal room of the lower story is vaulted, a central column supporting the radiating ribs of this arrangement. In time of a siege, this apartment was probably the residence of the common troops of the garrison. Pent up here day and night in considerable numbers, their situation would not be of an enviable kind. As being a little removed from the immediate source of danger, more light is usually admitted into the second story than the first. This, however, is done with some care. At Rochester nothing larger than an arrow loop is allowed in the second story. In addition to the principal apartments in the interior area of the keep, we have smaller ones situated within the thickness of the walls. The massive nature of the building admits of the formation of tolerably convenient apartments in these situations. They are uniformly vaulted in the roof. In order to prevent the strength of the wall being materially damaged by this arrangement, care is taken not to have these rooms similarly placed in consecutive stories. If the mural chamber be in the south wall on the second story, it is probably in the north wall in the third. These chambers have probably been used as the retiring rooms of the chief occupants of the fortress. We occasionally meet with fire-places on the second story. These consist of little more than a hearth, from which a funnel-shaped channel, terminating in an opening resembling an arrow-loop, takes the smoke to the outside of the building. It is a curious circumstance, that in some keeps no traces of a fire-place are to be found in any part of them. This is the case at Richmond, and more remarkably still in the Tower of London. It would appear that in ancient days the luxury of a fire was less freely enjoyed than now. The hardy sea-kings of Norway thought it effeminate to sleep beneath a roof, and the warriors of the middle ages considered a blazing hearth as unbefitting the profession of arms. The grand hall in most castles of importance occupies the third story. As at this elevation the strength of the walls is of less importance than below, windows are more freely inserted. Near the upper part of the keep, and within the thickness of the walls, a passage ran entirely round it. This has probably been to enable the garrison in time of a siege freely to communicate with every part.

Mr. Bruce here described the mode of operation of a sallying party, taking Newcastle as his guide; and next discussed the question of whether underground dungeons were common in Norman keeps; and said,—I have at length come to the conclusion that underground dungeons were the invention of a subsequent period—the Edwardian—and, strange as the assertion may appear, that they were proofs of advancing civilization. In the fearful struggle between Saxon and Norman that followed the advent of William on our shores, human life was esteemed a thing of nought. No Norman was safe outside the walls of his keep, except he were accompanied by a strong guard; and when policy dictated, the Normans did not hesitate to exterminate every living thing, and to subvert every habitation in extensive districts. Dungeons were of little use to the Normans. If they caught a foe that was worthy of their attention, they gave him six feet of earth, or, if he were a tall man, seven. These castles are land-marks in the tide of time; they are memorials of the past, which call upon us to be grateful for present mercies. How miserable the condition of these Norman nobles. Look at the gloomy pile, and say is it not a prison—a prison into which we would now shudder to put a felon. Yet these prisons, these above-ground pits, the Norman nobles built for themselves—they voluntarily incarcerated themselves, and unlike modern criminals, they used their best endeavours to keep their prison doors fast, and to resist the efforts of those without to throw them open. How piteous their lot when compared with the cottager of England at the present day—he is free to go where he likes, and when he likes, and should the hand of violence uplift his latch or affect his person, the might of Britain is put forth to protect him. Long may we enjoy our present comforts—let these enjoyments go on in an increasing ratio—but to understand and appreciate them let us preserve and study our Norman Castles.

THE FAILURE AT THE BRICKLAYERS' ARMS RAILWAY STATION.

THE doctrine of the coroner who held the inquest on the body of the poor man killed by the fall of the roof at the Bricklayers' Arms Station,—that the jury were not to inquire into the sufficiency or otherwise of the roof,—unsound, and should be reprobated.

For the safety of the public an investigation was demanded, and should have been made. No roof should be constructed so that the fracture of a single column should bring down the whole,—in this case more than 400 feet in length.* The fact is, unless we greatly err, this roof was waiting to fall. The third span, which still stands (two are entirely gone), is in a very insecure state; the columns are pushed considerably out of upright, and require immediate attention, to prevent another accident.

What appears to be a new passenger-shed, of great extent, is being erected at this station, adjoining the site of the fall: Mr. Kelk is the contractor engaged upon it. We could not learn the name of the architect or engineer under whose superintendence it is being constructed, and we are rather glad of it, since we feel it to be our duty to call immediate attention to the insufficiency of the roof which is placed upon it. This is in two divisions, each having a span of more than 70 feet, and is carried in the centre on small hollow iron columns, 20 feet apart. It is a queen-post roof, the place of the posts being occupied by light iron rods: the rest is of timber. Telford's formula gives for a span of 70 feet, a tie-beam, 15 in. by 11¾ in., and principal rafters 9 by 7, the trusses being 10 feet apart. Even those who have come to think Telford overcautious, will be astonished to learn that in this new roof at the Bricklayers' Arms station, the tie-beam is but 13½ in. by 6½ in., and the trusses 20 feet apart. We unhesitatingly assert that the roof is insufficient: if exposed to any accidental disturbing causes, failure must be expected, and, on the part of the public, we call for supervision. If we may judge from the secretary of the company, who wants a main requisite for his position, namely, good manners, this warning will be disregarded: in that case we must look to the government superintendent.

* We have been complained of for having attributed the fall of the roof to the failure of *one* column; our statement, however, was fully confirmed at the inquest.

A FEW GROPINGS IN PRACTICAL ACOUSTICS.*

As a branch of physical science, acoustics are understood in a general way; and various leading phenomena which will be here touched upon, most inquiring minds are familiar with; but we are not so well versed in their relation to our buildings as to our musical instruments, nor are we apt to look to the analogy which may subsist between the former and the latter,—in that, besides the propagation of sounds, the tempering agency of *dampers* demands attention. Such, however, we feel assured is the case, and is deserving of closer consideration.

Sound diverges alike in all directions, and in all weathers, seasons, temperatures, with the same velocity—unless impeded or accelerated by wind—and wherever it strikes, it is reflected at a like angle,—propagating itself by means of the obstacles with which it comes in contact: while the *distance* which it travels, therefore, depends on its original force, and subsequent reverberations, its *rate* is not at all influenced by these circumstances. The effect of the wind we may observe in the ringing of church bells in the distance, the sound of which, by turns, swells out, and sinks and dies away. The vibratory action of sound on the atmosphere is rendered visible by its affecting the motes in the sunbeam,—also disturbing cobwebs, and water in glasses: in concord, it will even shake small pieces of paper off a string.

The Air, to which we are indebted for hearing not merely rude noises and low murmurs, but musical sounds, and the delicate inflections of the human voice constituting speech, being the general medium of sound, its conducting power has from time to time engaged the attention of various philosophers, and the *velocity* assigned by these has been variously stated as follows:—

	Feet per second of Time.
Cassini and the French Academicians.....	1,172
The Florentine Academy	1,148
And Halley, Flamsteed, and Derham	1,142

The latter deduction has been that usually adopted; but later experiments, having a more careful regard to the temperature of the atmosphere, have indicated 1,130 feet, at 32° of Fahrenheit, as approximating more closely the actual velocity. With this datum, and considering light (from its extreme celerity) as being instantaneous, we are enabled to infer the distance of visible objects producing sounds—having only to multiply the seconds which elapse by the feet per second.

Other fluids besides air are conductors of sound; and their relative power in this respect proves to be as their density: thus, amongst the results of experiments made by Biot, Berthollet, and Laplace, on the vapours of water, spirits of wine, and ether, the relative distances at which a sound could be heard in the atmosphere, and in vapour of ether, appear as 158½ and 143½ yards. It has been found, that the tone which a sonorous body will produce is sharper in hydrogen gas, and graver in carbonic acid gas, than in atmospheric air. Now, the specific quantities of these respectively we know to be—

Hydrogen gas	0·074
Atmospheric air	1·000
Carbonic-acid gas	1·520

And the inference becomes obvious, that there exists an important connection between acoustics and ventilation, pure air being favourable to the conduction of sound, and that which has become loaded with carbonic acid the reverse. In fact, we have observed the muffled tone of a preacher's voice in an afternoon's service, as compared with the same in the morning. In like manner, as refraction of the rays of light is produced in water by its encountering the denser body, so, it is allowed, a gaseous body, denser than the atmosphere, such as a cloud, will refract or even reflect sound; hence its tendency to retard it is obvious. Mr. Curtis, in his treatise on the ear, has express reference to the influence which the state of the atmosphere exercises on the organ of hearing, and states that it seldom happens that those who live in a humid or impure air possess acute

* See various other papers on this subject in our previous volumes.

audition, deafness being much more frequent in such cases than where the air is pure and wholesome; and hence the greater prevalence of dullness of hearing amongst the poorer classes, from their residing in crowded lanes and close alleys. Here we have two effects produced from one cause, together detrimental to hearing.

The difference which we have mentioned, of the conducting power in these bodies, has had reference only to kind; but quality or condition has also its influence: thus, atmospheric air acquires with density an increase of conducting power, and has it also augmented by heat, although that produces the opposite condition. Bells are heard farther on plains than on hills, and still farther in valleys than on plains, because of the greater density of the air: if we hang a bell in an air-pump, and exhaust the receiver, and cause the clapper to strike against the bell, the sound will become fainter and fainter as the air is rarefied, and at length cease altogether when a perfect vacuum is produced. Captain Parry says that, during the intense cold experienced in Winter Harbour, he often heard distinctly people conversing, in a common tone of voice, at the distance of a mile; and instances his hearing a man singing to himself while walking along the beach at even a greater distance. Dr. Jameson says he heard, in calm weather, every word of a sermon at the distance of two miles! The air was no doubt considerably compressed in this case. Dr. Junot communicated to the Academy of Sciences the following interesting results of experiments made by him to ascertain the effect of attenuated and compressed air on the human body:—

When the pressure of the air was *diminished one-fourth*, the person placed in the receiver experienced a momentary distension of the membrane of the tympanum; inconvenience of respiration, the inspirations being short and frequent; pulse was full, compressible and frequent; superficial vessels turgid; eyelids and lips distended with superabundant fluid, hæmorrhage and syncope being sometimes induced; the skin was inconveniently hot, its functions being increased in activity; the salinary and renal glands secreted their fluids less abundantly.

When the pressure was *increased one-half*, the membrane of the tympanum suffered inconvenient pressure, which ceased as gradually as the equilibrium was restored; but respiration was carried on with greater facility, the capacity of the lungs seeming to increase, and the inspirations being deeper and less frequent. The interior of the thorax acquired an agreeable warmth, and the whole economy seemed to receive additional strength and vitality. The increased density of the air seemed also to modify the circulation in a remarkable manner; the pulse was more frequent, full, and difficult of reduction; the superficial venous vessels were reduced, and were sometimes completely effaced, so that the blood, in its return towards the heart, appeared to follow the direction of the deeper veins: the blood would thus be determined in larger quantity to the arterial system, and especially to the brain, rendering the imagination active, and giving to the thoughts the accompaniment of a peculiar charm, such as to affect some persons with symptoms of intoxication: the power of the muscular system was increased, while the weight of the body appeared at the same time to be diminished.

We have met with a pleasant anecdote of a trick played off at the expense of a conclave of philosophers, who after dinner were plied so bountifully with fresh air, perfumed with orange and lavender, that their host had difficulty in supplying the extra demand for wine, so exhilarating and sharpening were the effects of the pure air, supplied, as it probably was, under pressure.

In these circumstances, we see additional evidence of the important relation which good ventilation bears to practical acoustics. It has been shown that the conducting power of air is increased with compression: with rarefaction, on the other hand, it is diminished; as was observed by Saussure upon the summit of Mont Blanc, where the firing of a pistol produced no greater report than a child's toy-gun makes in a room. This fact, and the effects previously related, suggest a comparison of the respective merits of those modes of ventilation wherein the impure air is *drawn off*, and the pure thereby caused to follow as it were by suction and to make good the partial vacuum or rarefaction, with those wherein the pure is *forced in*, causing the impure to vacate by sheer pressure; and the result of the inquiry is necessarily in favour of the latter, seeing that compression of the air is at once favourable to its vivifying and its conducting powers.

Sounds are conveyed to a much greater distance during the night than during the day; which is considered to be mainly attributable to the air during the latter being traversed in all directions and disturbed by minute and singly undistinguishable sounds or pulsations—perhaps the last expiring vibrations of many sounds, together constituting that peculiar hum which distinguishes the "city closely pent" from peaceful rural scenes; and the absence of which gives to the night its death-like stillness.

The strong tendency of sound to ascend is proved at Table Mountain, at the ridge of which, 3,600 feet high, and rising perpendicularly about a mile from Cape Town, every noise made below, even the word of command on parade, is distinctly audible. Humboldt remarks that the barking of a dog has been heard when the listener was about three miles above, in a balloon. This phenomenon is probably solely owing to the upward direction of the heated atmosphere, and will hold good sensibly in as well as out of doors, where the currents may be active.

We have thus far spoken only of air as a conductor; and this for the reason that it is the principal agent for that purpose with which we are surrounded; but amongst fluids we have one much more active,—namely, WATER: on this body it does not appear that direct experiments have been made to ascertain the measure of its transmissive power; but which would doubtless vary with its density: in the absence, however, of such deductions, it has been inferred analogically, or by calculations founded on the relative elasticity of air and water, that the velocity of sound in the latter is 4,900 feet per second. Dr. Franklin thought he heard, in water, the sound of two stones struck together, immersed in the same, at the distance of a mile. It is asserted that the human voice has been heard over water, without the aid of art, the distance of from ten to twelve miles,—namely, from New to Old Gibraltar; and the cannonading in a fight between the English and French, in 1672, was heard at the distance of 200 miles over water.

But it is amongst solids that we find the best conductors of sound; and iron and glass appear to possess that power in the greatest degree; the rate of transmission in the former, according to Biot, being 10½ times that in air, or 11,865 feet per second, while in the latter it is stated to be as much as 17,500 feet. Dr. Chladni estimated the velocity in certain materials to be as follows:—

Air being represented by	1
Silver was	7½
Copper.....	9
Iron.....	17
and wood of different kinds from	11 to 17

His estimate would raise the velocity in iron to 19,210 feet per second, but it is probably excessive.

In respect to wood, it is well known that the ear applied to one end of a long beam will hear distinctly the stroke of a pin's head at the other extremity; but be it observed, that the same will scarcely be heard across the breadth of the piece, so much has the fibre to do in the matter, and the more so as it is straightened and more free from the interruptions of knots. When one extremity of a stick is held between the teeth, and the other is placed in contact with a table, the scratch of a pin on the table may be heard, though both ears be stopped. So sonorous, in fact, is wood, that it is chosen as the fittest substance for most musical instruments: it is also the material of which the stethoscope is made, with which we listen to the action of the lungs and heart. The difference between those substances which consist of fibres and such as are composed of grains, in regard to power of conduction, is fully exemplified in this material, and is worthy of remark: cases will occur for which sometimes the fibres and at others the more homogeneous material will be best adapted.

Stone is reckoned a good conductor of sound, but it renders the tone rough and disagreeable: a well-made brick wall has been known to convey a whisper nearly 200 feet. (For its conducting power, see THE BUILDER, vol. 3, p. 443). Of the earth as a conductor, we may judge by the fact that the North-American Indians apply their ears close to the ground to ascertain the approach of their enemies, when the distance is too great for the sound to reach them through the air: in like manner an army, bivouacking in the open air, has been apprised of the advance of a hostile force, the trampling of men and horses being much sooner heard through this medium. Generally, all solid bodies, the mass of whose structure is susceptible of vibratory motion from sounds impinging on their external atoms, possess the capability of transmission.

From what has been adduced respecting the force of sound, and especially as regards the human voice (and to which may here be added that Wesley once preached, and was well heard, in a natural amphitheatre of hills, to a congregation of 20,000, who must have occupied a space of nearly an acre and a half), it would appear that scarcely any apartment can be too large for its powers; that where it fails in such as are of ordinary size, the cause must be in construction; and that where this approaches perfection, little provision will be necessary for enhancing the effect of these powers. And, as regards the powers of substances as vehicles, the inference is, that in buildings, these act mainly as defecting agents, and their defects have to be guarded against.

We have dwelt thus much on the powers of various media to convey sound, because of the great regard which is given to *form* over *material*, in all questions on practical acoustics. The attractive fact of two persons placed considerably apart, but in the two foci of an ellipse, hearing each other comfortably (almost confidentially), seems to be the turning point at which all go off in the sole pursuit of form in designing an apartment; as if it were exclusively necessary and sufficient, in our churches and halls, that intermediate points should be provided for forwarding the voice of the speaker. We are convinced that what is mainly wanting is the prevention of defecting agents, and the obtaining for the voice or other organ of sound the fullest undisturbed predominance for the time being. The thousand coughs, and sniffs, and hems, notes of admiration and interrogation, the shuffling and the creaking, even of good listeners, the hum of street sounds through single, and often rattling, casements, with a remainder, too numerous to mention, though singly inconsiderable, yet aggregately aggravating, being generally equal to at least one more voice (or other organ as aforesaid), will suffice of themselves to render indistinct the best enunciation; but when to these are superadded more permanent destroying agents, the property of some of which is to absorb or give passage to, and of others to furnish echoes of, a voice which we shall suppose is no more than sufficient in volume to fill the space without any to spare, or in its articulation is just distinct enough to be understood when carefully followed,—it is easy to perceive the almost impossibility of ensuring that any building, for oral (and aural) purposes, and of whatever form, shall be well adapted for hearing in.

Were form the sole consideration, there would be a limit to the positions in which, in large apartments, the speaker and his auditors could be relatively placed, and the semi-ellipse, parabola, or some similar form of plan, with the rostrum in its focus, must prevail: with such an arrangement, the speaker harangues his audience the most advantageously, since, besides the circumstance of favourable construction, his auditors are exempt from the trouble of adapting themselves to the reception of sound from a new and perhaps unexpected quarter; but where many speakers have to succeed each other, it has objections which must be sufficiently obvious; and it becomes equally evident that where the form of plan referred to is not adopted, but one in which there is no limitation of the point from which the voice may issue, no such geometrical method can be pursued, or at least to any great extent carried out; but the acoustical arrangements must in the main be of another

kind, suited to that form of plan which may appear to be the most convenient for the occasion. To show that something else besides form is involved, instances might be quoted of buildings identical in principle in this respect, but the very opposites of each other as to hearing.

In the human ear, the tympanum is circular, and the fibres are of equal length, radiating from the centre to the circumference. Sir E. Home considers that it is this equality of the radii which adapts it to musical sounds: he found that the tympanum of the elephant was oval, the fibres varying in length like the radii of an ellipse, and he is of opinion that the long fibres enable the animal to hear very minute sounds, which it is known to do: on a pianoforte being played upon in the hearing of the elephant at Exeter-change, it was found that while the higher tones hardly attracted the animal's notice, the low ones roused his attention: in the great lion the higher tones excited great attention, but the flat ones were no sooner sounded than he lashed himself into the most frightful fury. Sir E. Home found this inequality of the fibres of the tympanum in neat-cattle, the horse, deer, hare, and cat. Buffon made many trials on persons who heard better with one ear than with the other, and who from that cause had what is called a bad ear for music, and he always found that the defect proceeded from their having unequal ears, and receiving thereby at the same time unequal sensations: such persons hearing false, also, without knowing it, sung false. There is here surely some excuse for "the man who hath not music in his soul!"*

THE RESTORATION QUESTION.

Our forefathers, for the last two centuries, spoilt for us many beautiful churches, the work of the middle ages, but they did it honestly. They said they were ugly—the remains of a barbarous age—and only used them (where they had the means) as a groundwork for classical erections of various kinds; but as they did not understand or care for the old work—in fact, took no notice of it, except where it came in the way of their own productions in other parts,—they left it just as it was. Thus in almost every church, even in the towns, where the "improvement and beautifying" of churches was carried on to a great extent, and all kinds of beauties and deformities, of Egyptian, Indian, Grecian, Venetian, and Palladian styles, were thrust in regardless of cost, still there were left extensive remains of the veritable work of the first builders; not only the masonry of the walls and external mouldings unimpaired except by the gradual action of the weather, but even hosts of beautiful, delicate ornaments within, carved in stone or wood, or painted on the walls or roof, or on wooden panels. These were, indeed, often removed from their right place, and put to some absurd use, or hid in some corner, where only the searching eye of the antiquary has been able to find them; but still there they were, the real, actual work of the builders and painters of the mediæval times,—not destroyed, because they were not thought worth destroying.

And so, when we began again to understand and value these masterpieces of Christian art, there was hardly a single church where the student could not see the real, genuine works of the old builders, and read their spirit in them.

But, alas, experience has shown the truth of the accusation, that "Englishmen see with their fingers." From admiring, they passed to tracing and copying, and then to collecting specimens,—in plain words, stealing wood and stone, and much more frequently more valuable fragments of brass and glass.

But the method which has been adopted by the same class of people for the last few years, and which is now in the height of its flourish, is one certainly less palpably dishonest, inasmuch as it is done with the sanction and assistance of the guardians of the buildings, although, for my part, I do not see that it is a bit less unjust, either to past or future generations; but however this may be, one thing is certain, that it is by far more destructive to the buildings themselves.

* To be continued.

Let us carefully examine the process. The object of the Ecclesiologists of the present day, when they have got hold of an old church, is to restore it.

Why, the very name of restoration is absurd. If a thing is removed or put to a wrong use or lost, you can restore it again when it is found.

If this has happened to the church in question—if it has been moved away from its place, or turned into a barn, or heaped over with ruins or the sea-sand, it can be restored; but this is not the case, at least in 99 out of every 100.

The building is just where it always was; it has never been anything else but a church, and every Sunday hundreds of people have worshipped in it. But it will be said in answer, "What we mean is to restore to the church all that has been lost of the original buildings and decorations."

By all means do it if you can—only find them first. Let us begin with the outside. For instance, in the year 1480 we will suppose the spire which rose 100 feet above the tower, after being carelessly left in bad repair, fell down one stormy night: the roof of the church, which it broke through, was soon after repaired, but the spire never replaced. Now, then, find that and restore it to its place. If it is not to be found entire hid in some neighbouring wood, or buried in the churchyard, or locked up in the church chest, then look for the parts of it; perhaps you will find its beautiful little windows somewhere in the church, or, at any rate, the stones built into the walls of the neighbouring mansion, or the church itself. Let us put them together again. Alas! it is hopeless; the spire is utterly lost, no human power can raise it again.

However, here is another task; let us see whether it will be easier. In the parish register we read the following entry (no matter about the old spelling):—"On candelmass day, in the year of grace 1379, Domina Alice Lenton did, for the love she had to our Lady, cause one image of her to be carved in Normandy stone, and set in a niche over the porch."

Let us see what there is left now. Certainly there is the niche, looking more like a hollow in an old decayed tree; but never mind that; where is the image? There seems to be something, an upright rounded lump of stone in the niche, and now that we fix our eyes upon it, it may very likely be the remains of an image. However, as the day is cloudy and there happen to be two or three swallows' nests which rather impede observation, let us get a ladder and make a close inspection.

Yes; now we see the figure indeed, and though worn considerably away, still there is beauty enough left to tell what love Mistress Alice Lenton had to our Lady. However, the whole of the front part of the figure is sadly decayed; time and the weather, air and rain, have eaten away nearly an inch in thickness from this part: look at the face,—the eyes still show, at least the outer edge of each eye in the shade of the hair which falls in slightly waving lines still so perfect; but the nose is worn to a slight ridge which can scarcely be felt with the hand, while the mouth and chin have quite disappeared. It is just the same with the front part of that robe which hangs in straight, sober folds, and hides the feet; it is quite gone.

Now, let us restore this that is gone—let us search for the lost parts—look in the dust and earth underneath—we may find some crumbled remains.

Oh, foolish thought! no one would entertain it for a moment; they are carried away, the winds know where; turned to earth, and who knows what beside. No human hand can ever restore them. By the help of what still remains, in the more protected parts of the figure, the *imagination* can restore them, and has done so a thousand times, and has even fixed a living expression on the smooth stone; but the hand can never do it. We might carry on the same ideas with regard to the inside. There may be, perhaps, five or six old benches with carved ends, high poppy heads, or else simply low square ends cut with trefoils or coats of arms; or there may be some few squares of encaustic tiles, or some elaborately carved stone sedilia in the chancel. Why should we destroy these or destroy the work on them by carving it over again? They suggest such pleasing thoughts to us, and interest us so much, let us leave them still for those that shall come after. A restorer would take them away and supply their place with new ones done exactly after the old pattern; but, then, all the interest of them is gone.

But it may be said, "They are in such an unsound ruinous state as not to be fit for use." Well, supposing they are never required to be used now, as is the case with the sedilia in most country churches, surely this is no matter: leave them there unhurt till they fall to pieces, unless you can preserve them any other way without injury. Or if they are in constant use as the benches, surely in most cases they may be made firm and sound, by iron bands or props, which will not be seen, or at least will not disfigure them much; and of course if it has come to the worst, and they are quite rotten or broken past preserving, then let them be thrown away, their day is past, and let their place be supplied by new ones. Make them of what pattern you like, the most beautiful and suitable you can, only do not call it restoring the old: be honest, and acknowledge that it is a new piece of work. If then it be asked, "What are we to do to our churches?" I would say, "Better do nothing than too much." However there is plenty to be done. Clear away all the rubbish of the two last centuries; no matter whether it be meant for use or ornament, or whether it be the dust and dirt of careless neglect, it is all equally ugly and unsuitable: only do it carefully, for fear of injuring any old work beneath; then substitute for all this the best you can now put. No amount of modesty can hide from us the fact, that some church architects and decorators (not all) have already surpassed all the excellence of those times.*

Servator.

DISFIGUREMENT OF LONDON-BRIDGE.

Laudable zeal is being shown for the restoration of works of merit executed in bygone days, but let us not fail to be equally zealous in preserving the works of our own age from injury. No one can view London-bridge but must admit that it is a work of noble grandeur. It is with regard to the building recently erected, and not yet finished, on the Southwark side, that I call attention. The most casual observers cry shame, to see a building thus intruded upon that magnificent structure. Upon inspection it will be seen that the neighbouring buildings, viz., Fishmongers' Hall, the Adelaide Tavern, and Fenning's Wharf, have been reared at a judicious distance, so as not materially to injure the general effect of this bridge. So much do I deprecate it, that I can only say: If a subscription be set on foot for its removal, I will most willingly subscribe my mite, and have no doubt that many others will do the same. I will give you a simple rule of three sum: if, as it has been suggested, Mr. Barry should be hanged for what he has done at the Westminster Palace—what sort of punishment do the parties concerned on London-bridge deserve?

A Citizen.

IRON ROOFS, NEW BAZAAR AT CORK.

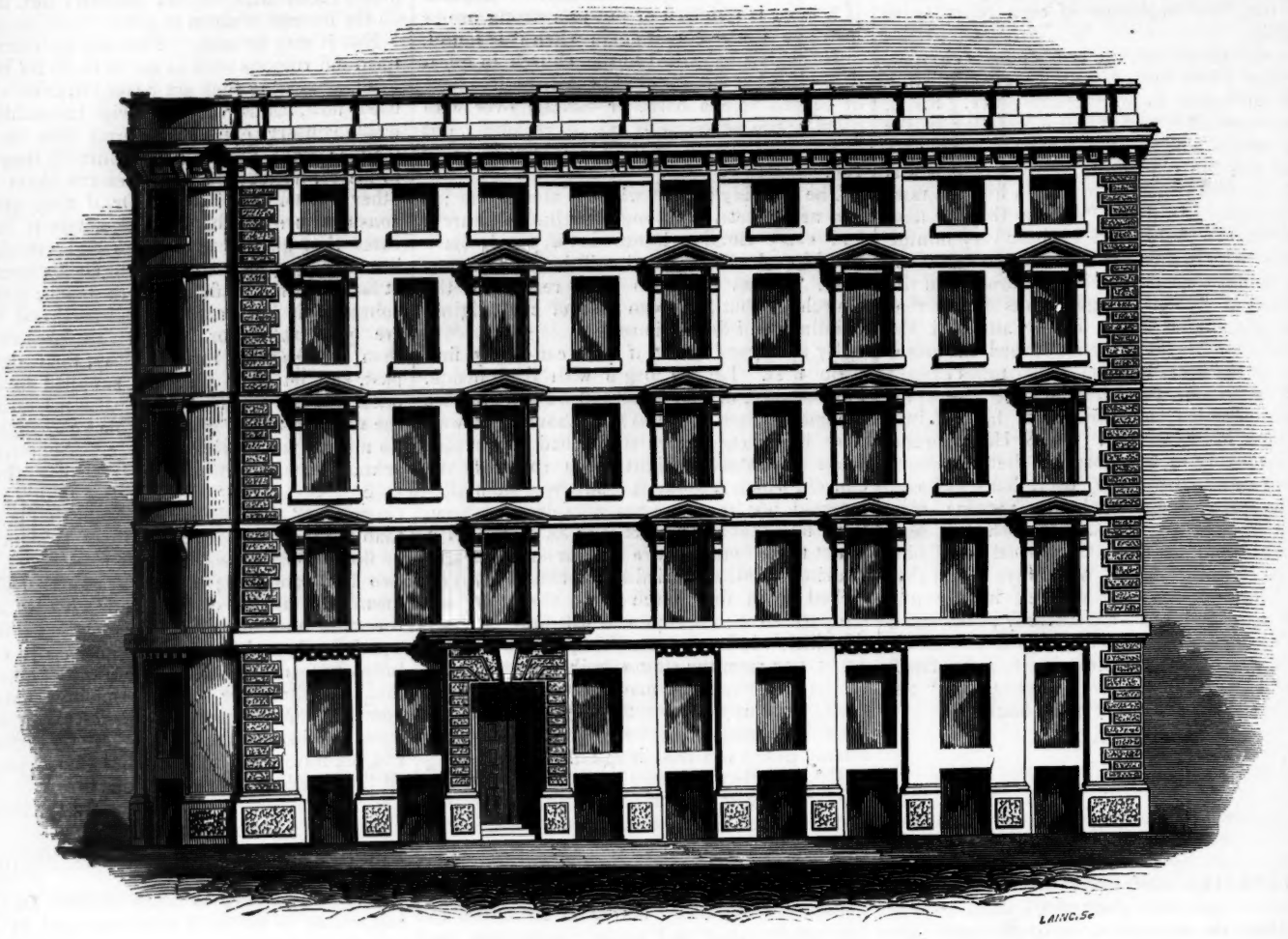
Mr. Editor,—As a *pendant* to another picture, I offer you a sample of insane ironfounders, in the following tenders delivered to the Corporation of Cork for erecting wrought-iron roofs to the New Bazaar. Mr. Alexander Deane, architect:—

Beale, Scott, and Co., Cork	£3,000
Fox, Henderson, and Co., London	2,600
Paul, McSwiney, and Co., Cork	2,280
Perrott and Sons, Cork	2,090
Mallet and Co., Dublin	1,220

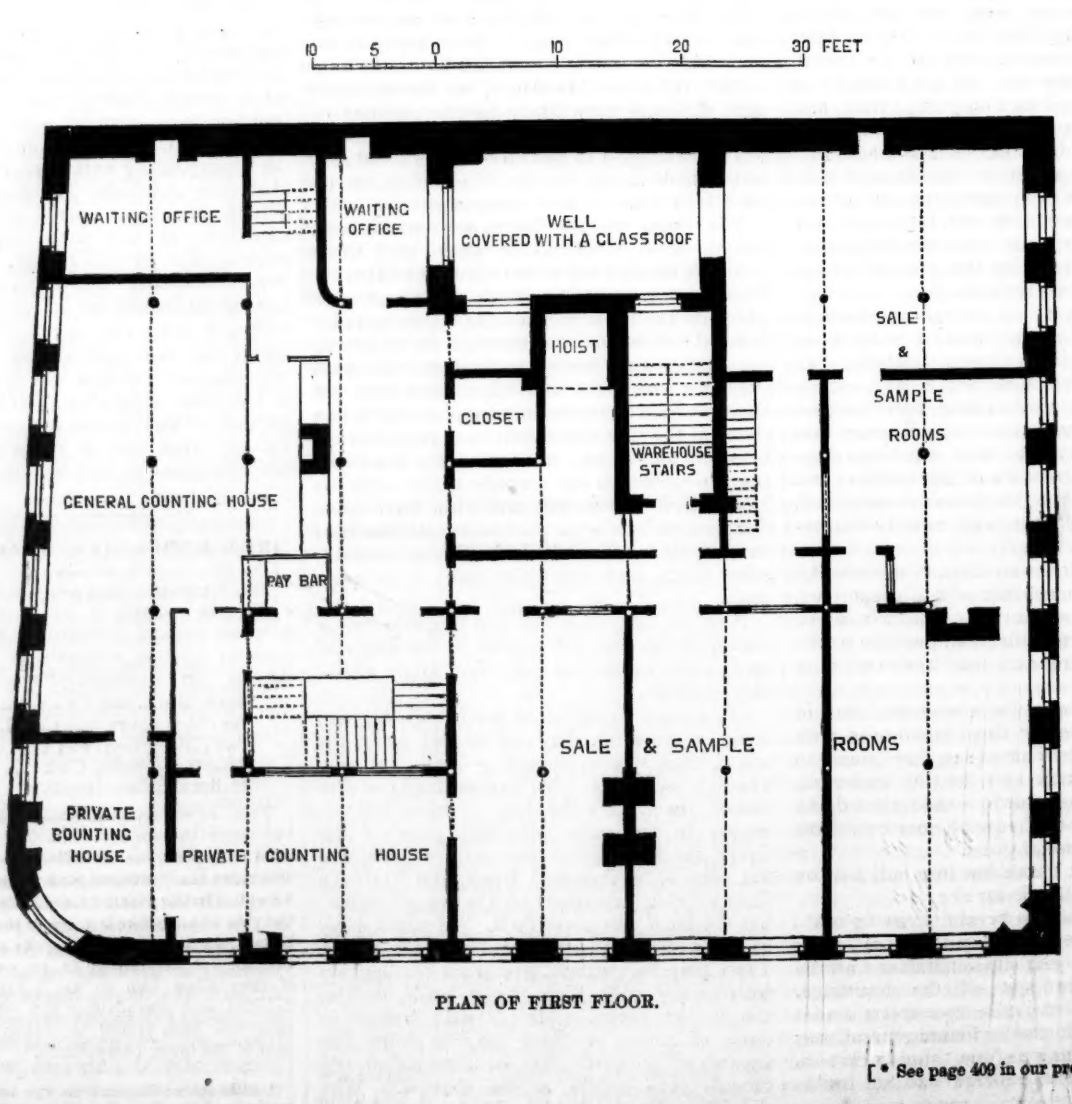
This, as we say in Ireland, "Bangs Banagher;" but mark the sequel: Mr. Mallet's tender having been accepted, he is called upon to perfect his securities and proceed with his contract; hereupon he writes to the Market Committee a letter, in which the plea of a mistake is urged in the thickness of glass, though the specification is quite clear, and he offers the Market Committee to go on with the contract if they allow him to use 1-8th glass instead of 3-16ths, and also advance him 90*l.*, which arrangement has been agreed to, much to the dissatisfaction of the other competitors. R.

* Although we dissent from the tendency of these remarks, we have given the communication a place, as likely to afford a useful check to some would-be restorers falling away into destructives.

A MANCHESTER WAREHOUSE.—MR. J. E. GREGAN, ARCHITECT.*



ELEVATION.



PLAN OF FIRST FLOOR.

[* See page 409 in our present number.

OLD HOUSE AT STIDD, NEAR RIBCHESTER,

INTENDED FOR FOUR FAMILIES.*

THE BRITISH LINEN COMPANY'S BANK, EDINBURGH.

AMONGST the most important and costly buildings added to Edinburgh lately is the British Linen Company's Bank in St. Andrew's-square, from the hands of Mr. Bryce. On the first view the façade presents, from its great altitude, high degree of ornamentation, and row of terminal statues (seen above the middle against the sky), a novel aspect. I cannot avoid thinking, however, that more should have been made of it. It is not every day that an architect has a first-class public building to design; it is seldom that a fine site is available; and rarely indeed does he obtain access to some 30,000*l.* for the development of his ideas: when he does so he ought to take pains and do his best; if he fail he is amenable to public criticism.

The ground story is brought forward and formed into a high rusticated basement for a hexastyle Corinthian ordonnance above. The columns being detached, the front rooms on the ground floor must suffer from the great thickness of the wall entailed by the projection for their support. However, Mitford says,—"Magnificence must be paid for in convenience as well as money." The doorway occupies the centre of the five bays, and has, in common with the windows throughout, dressings of the ordinary description—excellently membered, it is true, but incontestibly of the most hackneyed form. For the second-floor windows the stereotyped triangular pediment is used—a feature whose propriety has been often questioned, but the distressing repetition of which seems to indicate a sterile fecundity of imagination among architects. The building in question is the third in the square (and there are others throughout the city) by the same architect, in which those precious pediment dressings appear on the second-floor windows. What would be thought of an author who introduced the same chapter into half-a-dozen essays on different subjects?

The details are mostly well drawn; but I cannot extend commendation to the choice and disposition of the characterizing features. The high basement seems to be a favourite of Mr. Bryce's, though it detracts much from the dignity of the ordonnance, and militates against the unity of the whole. We are not aware of any advantage secured by its adoption; on the contrary, it seems to have induced an altitude extravagant for the length of the façade, and the painful sacrifice of a continuous entablature for one broken over each column,—a practice reprobated by the best writers. "Everything," says Professor Hosking, "tending to break the leading lines in a composition should be avoided;" and, alluding to the abuse in question, he says, "it makes the ordonnance,"—what should be the gist of the composition, "*a mere excrescence.*" Again,—"the practice of raising lofty basements to support columnar ordonnances is injudicious." * * * * "The upper and crowning cornice, if in proportion to *its own ordonnance*, must be disproportioned to *the whole elevation*, which takes from that member a character of meanness, as it may or may not be fitted to its whole height." The cornice adopted in this instance is not the legitimate one of the order, from which it differs greatly in size and in having modillions. To some observers Mr. Ritchie's six statues may constitute an attraction, but their position is as fatal to the appreciation of their merits as it is injudicious in reference to the overloaded columns below.

I shall have something more to say.

CAUSTIC.

* See page 409 in our present number.

RAGGED SCHOOLS, HOLLOWAY.—On Wednesday, the foundation-stone of a ragged school was laid in Brand-street, Holloway. *Honorary* architect, Mr. James Harrison. It is in the Tudor style, and will have a residence for the master and mistress. The dimensions of the building are—depth 50 feet, breadth 28 feet, extreme height 48 feet. The school-rooms will accommodate 600 children of both sexes. The interior is to have an open timber roof.

THE PARIS EXHIBITION of works of living artists is fixed to commence on the 15th of December next. Englishmen will be allowed to exhibit on exactly the same conditions as natives, provided their works be declared of sufficient merit by a jury nominated by the artists themselves.

LAW DECISION ON SALE BY AUCTION.—At Wolverhampton lately, the County Court nonsuited an auctioneer, as plaintiff, in a case wherein the defendant refused to pay for a boat knocked down to him while the auctioneer was standing on another, for which the defendant urged in evidence that he had meant to bid.

BIRMINGHAM ASSESSMENT.

BLIND SURVEYORS.

SEVERAL correspondents are very anxious that we should point out, with reference to the tenders for assessing and mapping Birmingham,† that architects, surveyors, and valuers can be just as blind on an occasion as builders, and they seem to think that we are disposed also to be blind for once, and overlook the absurd discrepancies which appeared in the tenders in question.

The differences are, indeed, most striking and distressing. We find one well-known respectable professional man asking 10,850*l.* for making the assessment which another individual is willing to undertake (after a fashion) for 400*l.*; and while one puts down 1,935*l.* for the map, there is another who wildly offers to do it for 50*l.*

The fact is, the majority of those who tendered on that occasion knew nothing about the matter, and had no means of obtaining correct information as to the trouble it would involve. They made a guess, trusted to chance to bring them out of it, and deserve reprehension for their pains. In making their selection, the board should remember that a cheap assessment in the first instance may be a very dear one ultimately: they ought to appoint a man of known ability and reputation, and should pay him properly, that the work may be properly done.

The guardians have since resolved that tenders exceeding 2,000*l.* should not be entertained, and selected the following eight from the competitors for further consideration,—viz., Messrs. G. Dyke, Leversege and Corfield, G. Thompson, Hebbert and Faucit, J. D. Paine, I. Newey, C. W. Robertson, and P. Gannon.

SHIP CANAL THROUGH CENTRAL AMERICA.—We perceive that a convention between Great Britain and the United States relative to the establishment of a communication by ship canal between the Atlantic and Pacific Oceans has been signed at Washington and ratified. We hope, however, that the statement of our Bahama correspondent, Captain Nelson, of the Royal Engineers, in our impression of 27th July last, will not be disregarded.

† See p. 406.

THE COMPETITION FOR DRAINAGE OF LONDON.

PERMIT me to ask as a favour that you will insert, in juxtaposition, the following extracts from Mr. Frank Forster's report on his plan for draining the southern portion of the metropolis, with some from one of the 116 plans submitted to the commissioners of sewers in September last. I am desirous to enable the public to attach a proper value to the assertion of Mr. Forster, "that he has derived no practical assistance from any of the plans;" and also to render transparent the injustice which the commissioners are practising upon a great portion of the 116 competitors by allowing their ideas to be "used up" by their princely-paid servant, without remunerating them, or awarding them even an empty honour.

The plan extracted from is one of 46 out of the 116; being the greatest number that agreed upon any one principle of drainage. Amongst these forty-six, it is not altogether unreasonable to suppose that the whole "material" for Mr. Frank Forster's plan has been supplied, when it is seen in how many essential points his plan agrees with only *one* out of the forty-six; and when it is remembered that the committee on the competition plans reported themselves to have "carefully *examined* and *considered* the whole of the plans and suggestions" submitted to the commissioners.

I shall preface the extracts by explaining that the main feature of Mr. Frank Forster's plan is, in principle, identical with that of the forty-six plans above alluded to;—viz., "An inland tunnel (or main sewer) running, in a parallel direction, to a reservoir in the marshes below London, and discharging sewage, not required for manure, into the river below tidal influence."

Mr. Frank Forster's Report.	*Plan sent in to Commissioners by ——.*
"It is proposed to form a double *reservoir, capable of holding at least twenty-four hours' drainage.*	"The works at each depot (or outfall) would be similar in arrangement, but not in extent. * * Each tank would be of sufficient capacity to *receive the full quantity of sewage flowing into the depot in twenty-four hours.*
Reservoir to discharge its contents at high water, delivering them by means of pipes near the middle and at the bottom of the river.	Provision would be made to *discharge the sewerage* (from the tanks or reservoirs) *at proper times into the Thames, at a point which would ensure its being carried off.*
The sewerage will be *lifted into the reservoirs* by *means of an engine* from the main sewer.	From this depth (the level of the outfall) *the sewage would be lifted* by peculiarly constructed pumps. * * *These pumps would be worked by steam engines.*
And (I propose) to connect with the chimney of the *smoke-consuming furnace of the engine*, all the passages from which *any gases could escape from the sewer.*	The *boiler furnaces* would be adapted to the *ventilation of the sewer.*
It is not proposed that the engines should have to raise all the storm-water or land floods; these will be provided for in extraordinary cases by the four existing outlets."	At suitable points they (the proposed new main sewers) *would have communications formed with the river for the purpose of easing them in cases of excessive flood.*"

These extracts will, I think, fully establish the strong similarity in principle, and I doubt not that, if the remaining forty-five plans could be compared with Mr. Frank Forster's, the whole tale would be told. I do not mean to imply that Mr. Frank Forster has no original ideas of his own; but I do assert and maintain that in this case it would have been only just to competitors, as well as graceful in the Commissioners of Sewers and their chief engineer, to have acknowledged that their plan, though it may have been *original*, is not *novel*, being already embodied in the forty-six plans alluded to as "carefully examined and considered" by them. TBA.

Several other competitors have sent similar statements: amongst them Messrs. Dredge and Stephenson put the following in juxtaposition:—

August 24, 1849.—"We propose: The sewer to be divided into sections, each having a sufficient *inclination* to generate a stated velocity, this inclination being obtained by *lifts* at certain stations, where the sewerage will be pumped up by steam power in *a closed shaft.*

"The *separation* of the sewage from the surface waters.

October 12, 1849.—"Running a main outfall sewer along the line of the Grand Surrey Canal, and having one engine station near Cold-blow-farm; where the sewerage will be pumped over the surrounding country, or pumped through a pipe into the river *below Greenwich marshes.*"

Mr. Frank Forster (August 1, 1850), says,—"I have adopted the following *principles* for my guidance:—To maintain a continual and unremitting flow, with the aid of *lifts* where necessary, in all the sewers along their whole length, by which the evils arising from pent-up sewerage may be avoided. To construct the sewers at inclinations so proportioned to the volume of fluid to be carried off by each, that the velocity of the current shall keep them clear of deposit. This lift and shaft I propose to place *completely under cover.*

"To provide a natural escape, by the power of gravity alone, for storm waters and land floods, *independent* of the ordinary sewers.

"I beg to recommend the top of *Woolwich Reach* as the point for delivering the sewage into the river. The course of the main sewer will be along Greenwich marshes, Trafalgar-road, to the Ravensbourn, across Union-street and Collier-street, where the south main line diverges. This continues by Loving Edward's-lane, along the Old Kent-road, to Surrey Canal bridge, along Albany-street, in a straight line across to St. Mark's-road, and by Camberwell New-road to St. Mark's Church, Kennington."

ARCHITECTURE AND BUILDING IN IRELAND.

THE contract for plastering and decorating the interior of High-street Chapel, Dublin, was some time since disposed of to Mr. Buckley for 1,000*l.*: the plan of building is a Greek cross. Mr. Patrick Byrne, architect to the city, is superintending the execution of the work; portion of the ceiling over altar is completely finished.——The Poor Law Commissioners are about building union workhouses at Mitchelstown, county Cork, and at Portumna, county Galway, according to drawings by their architect, Mr. George Wilkinson.——The Board of Guardians of the Dunshaughlin Union have advertised for proposals for the erection of a school-room and dormitory for the female workhouse children.——The board of superintendence of City Prisons, Dublin, are about erecting a new call-hall, consultation-room, stores, &c., at Grangegorman Penitentiary, and purpose remodelling the present inconvenient chapel, and erecting a new altar therein, plans having been submitted for same by the board's architect, Mr. J. S. Mulvany.——The Board of Public Works purpose erecting a new kitchen, bath, fumigating, and reception-rooms, instead of those belonging to the city department, adjacent to the laundry, and which are to be given up to their use by the board of superintendence.

A valuable application of Mr. Forsyth's well-known Hercules to the purposes of a swivel bridge, has just been completed by Mr. Barry D. Gibbons, civil engineer to Kingstown Harbour Commissioners. It has fifty feet open, one end turning upon a centre and revolving upon a circular railway; its weight is upwards of twenty tons, and so well poised and adjusted that a power of 200 pounds freely moves it.——The Grand Canal Company, by adopting this plan, might, at a small expense, remove the greatest nuisance in or near Dublin—Ringsend-drawbridge.

The late Right Rev. Dr. Fleming, Bishop of Newfoundland, bequeathed in his will the sum of 300*l.* towards the completion of the convent of St. John's, Newfoundland, plans, &c., for which have been furnished by Mr. Mulvany. He also left the sum of 1,000*l.* for a figure of a "*dead Christ*," to be made by Hogan, the Irish sculptor, and placed in the Cathedral of St. John, Newfoundland.

The O'Loghlen Testimonial has been placed, during the past week, in the large entrance hall of the new Court-house, Ennis. The statue is eight feet high, and represents Sir Michael in his judicial chair, draped in full dress costume of Master of the Rolls: it is placed on a pedestal five feet high, at the corners of which stand two female figures representing "Justice and Mercy." Mr. Joseph R. Kirk, R.H.A., sculptor. Cost, 1,500*l.*

On Tuesday week an order arrived from the contractors for completing the Cork and Bandon Railway, Messrs. Fox, Henderson, and Co., to the sub-contractor, Mr. Brown, directing the immediate suspension of the works, and 200 men were thrown idle. It is stated by the directors that the stoppage of the works was resorted to by the contractors to coerce the directors not to issue debentures to other parties than the contractors, the borrowing powers of the company being limited to 80,000*l.* Of this sum the Exchequer Loan Commissioners are to advance 35,000*l.*, of which the contractors are now entitled to 10,000*l.*, having certificates for the execution of 22,000*l.* worth of work, besides being shortly entitled to 10,000*l.* more; additional works, to the amount of nearly 22,000*l.* more, being executed. The directors state that the contractors are bound by their deed of contract to complete the line within the specified time, and upon failure thereof, that they are empowered to void the contract and complete the works themselves.

The sum of 342*l.* which has been collected by subscription in Dublin towards the erection of a monument to O'Connell, has been appropriated to the decoration of a stained glass window in the Rev. T. Matthew's new chapel.——The managing committee of the Mendicity Institution have advertised for designs for appropriating a portion of the present buildings to baths and wash-houses for the use of the poor, and have offered a premium of five guineas for the best plan.——A member of the profession has offered his services gratuitously to the Dublin Mechanics' Institute for the decoration of their theatre, and the erection of additional class-rooms.——The entire of one side of Park-street, Dublin, has been recently pulled down, for the purpose of erecting a new terrace thereon, by order of the Hon. Sidney Herbert, upon whose property the improvements are contemplated.——The Earl of Erne is about erecting a new butter market on his estate at Lisnaskea. The style is Tudor Gothic.

STAINED GLASS.

St. Matthew's, Bank Foot, Bradford.—In the new church of St. Matthew's, Bank Foot, at Bradford, Yorkshire, the east window of the chancel has been fitted with stained glass, the work of Messrs. Barnett and Sons, of York, of which our correspondent speaks well. The window is in the Decorated style, and consists of three lights with flowing tracery in the head. In the centre light is a representation of the crucifixion, with the Magdalen at the foot of the cross. Above the head of the Saviour are the letters I.N.R.I., and on either side a pater bearing the legend "*Bibite ex hoc omnes*," and the sacramental cup. In the left hand, or north light, is a figure of St. Matthew, the patron saint of the church, with an open volume, and a scroll, on which is inscribed "*Liber Generationis Jesu Christi*," and in the contrary light a figure of St. Thomas, bearing the evangelist symbol of a square rule, and a scroll inscribed with "*Beati sunt qui non viderunt et crediderunt.*" This last saint has been introduced, the window being a tribute of affection from Mr. E. B. Wheatley, of Mirfield, to the memory of a parent. It is due to the donor of this window to state, that by his noble generosity he has laid his fellow churchmen under another tie of gratitude, in addition to many, the fruit of former years, and we hope he may live long to witness the happy results of Christian liberality so holy and so free. The architects were Messrs. Mallinson and Healy.

St. John's Church, Waterloo-road, Lambeth.—A painted window, containing 98 feet super. of glass, has been recently put up in the east window of St. John's Church, Waterloo-road. The design comprises in the centre a crucifixion, in the manner of the early Christian painters, with figures of St. John, Mary Virgin, Mary Magdalene, at foot of the cross, &c.: the cross is surmounted by a pelican in her piety, above which are angels holding a crown of vine leaves. The border contains figures of the four Evangelists, with their emblems beneath the feet of each; also the *Agnus Dei*, chalice and wafer, &c., comprised in a rich mosaic, in which are introduced passion flowers, crosses, the emblems of the Trinity. The colouring throughout is rich. In the design generally a severity of feeling adapted to the devotional character of the subject has been observed, at the same time with an endeavour to avoid the imperfect drawing of the early artists. The work has been executed by Mr. Wilmshurst, from the designs of Mr. N. J. Cottingham, at a limited cost. The reredos and sacrarium are decorated in polychrome (less successfully than the window); and a large painting of the entombment of our Lord is in progress for the former. The style of the church is Domestic Greek, so to speak: the strictly correct character of glass for such a building is still a question.

MEMS. PROVINCIAL.

THE foundation stone of a new tower to Halstead old church was laid on the 20th inst. Mr. Clarke, the diocesan architect, furnished the design.——In a field at Hadstock, known as the "Sunkin Church Field," the Hon. Mr. Neville has discovered a Roman villa, with hypocaust, flues, &c.——It has been determined to proceed with the extension of the chancel and the Norman east end of St. Peter's, Northampton, on the plans of Mr. Scott, architect, as amended from late discoveries, leaving the contract for interior fitting up for further subscription.——A parsonage house is about to be erected at Bursledon, on plans furnished by Messrs. Hinves and Bedborough, of Portland-street, Southampton, architects.——Workmen are engaged in fixing a new lightning-conductor to the spire of Salisbury Cathedral.——Lord Campbell, while complimenting Monmouth on the condition of the judges' lodgings, in his charge to the grand jury, complained of the wretched state of those in the adjoining county of Gloucester, which, said his lordship, are not fit to live or breathe in.——The Liverpool Gas Company have, as usual ever since those great reductions of price which were to ruin them, announced a dividend of five per cent. for the last *half*-year, being the highest allowed them by their own Act of Parliament.——An aisle and small gallery, with about 250 additional kneelings, is to be added to St. Paul's Church, Seacombe.——A proposal has been originated in Darwen to construct public baths, as a memorial, in that town, to the late Sir Robert Peel.——The foundation-stone of the church of St. Jude, in the Inkleys, Birmingham (Mr. C. W. Orford, architect, and J. Wilson, builder), was laid on Wednesday week.——Congregational schools have been erected at Wednesbury, at a cost of 1,400*l.* Mr. B. Round has given 550*l.* towards the erection. The building is of stone, in the Early English style, with upper and lower room, each measuring 55 feet long by 28 feet wide, and accommodation for upwards of 600 children.——It has been resolved to form a "Peel Park" at Macclesfield, and, if possible, also to establish a free library and reading-room, in honour of the deceased statesman.——A sort of district preparatory Exhibition of Industry has been got up at Nottingham, which is said to be both extensive and numerously attended. One of the local newspapers is being printed in public, by way of industrial exhibition. The Mechanics' Institution is the *locus in quo*.——The Leeds Town Council are about to seal the contract entered into with Mr. George Clark Pauling, of Manchester, for the formation of new sewerage. The amount of tender is 39,804*l.*, which is 5,154*l.* more than that of Messrs. Warren and Dunroche, who, as stated in the *Intelligencer*, declined to complete the contract, which was offered to them. The work will be commenced forthwith.——A new parsonage house is about to be built at Holbeck, on a plan provided by Messrs. Perkin and Backhouse, of Leeds, architects.

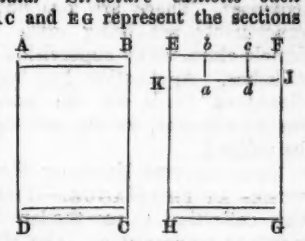
Books.

On the Strength of Materials, with original and useful Formulæ specially applied to Tubular Bridges, Wrought-iron and Cast-iron Beams, &c. By THOS. TATE. Author of "Principles of Differential and Integral Calculus," &c. Longman, Brown, Green, and Longmans.

Tables of the Strength and Deflection of Timber. By WILLIAM LEA, Surveyor. Simpkin, Marshall, and Co., Stationers' Hall-court.

Mr. Tate is an indefatigable and a useful author. The purpose of his present volume is sufficiently indicated in the title. It is full of valuable algebraic and other formulæ, on which such results as the following are established:—

Why the Cellular Structure exhibits such Strength.—Let AC and EG represent the sections of two beams undergoing transverse strain, *in all respects the same*, excepting that in the former case the material at AB is composed of horizontal plates in contact with each other, whereas in the latter case the material is arranged in the form of cells; the horizontal plates being connected by vertical plates or ribs, *a*, *b*, *c*, *d*, &c.



When thin plates of wrought iron are subject to compression, they double or crumple up long before the material would be destroyed under ordinary circumstances by crushing. In the first case of construction (1st fig.), no means are employed to counteract this tendency to double; but in the latter case it is different. Here the horizontal plates, as well as the vertical ones, have a tendency to double up; but the direction of this tendency in the former is in a plane at right angles to the plane in which the latter would take place; that is to say, the horizontal plates EF and KJ tend to crumple vertically, while the vertical plates *ab*, *cd*, &c. tend to crumple horizontally. Again, the direction of greatest *strength* in the vertical plates is in the vertical line, and at the same time the direction of *weakness* of the horizontal plates is also in the vertical line, and *vice versâ*: hence the horizontal plates EF and KJ are prevented from crumpling by the vertical plates *ab*, *dc*, &c. and *vice versâ*. It is evident that the horizontal plates EF and KJ could not crumple without exerting a vertical strain upon the vertical plates *ab*, *dc*, &c.: and, in like manner, the vertical plates could not crumple without exerting a horizontal strain upon the horizontal plates.

It appears, therefore, that the object of the cellular structure is to counteract the tendency which thin plates, acted upon by a compressive force, have to crumple, and thus to cause the tubular beam to be subjected to the same laws of transverse strain as an ordinary beam. Hence it is not necessary that the bottom part of the tube should have a cellular structure.

Mr. Lea's "Tables" are designed for the practical use of architects, builders, engineers, and others interested in converting timber into scantlings for building purposes generally, or for otherwise sustaining transversely any given pressures. The timber selected as the unit or standard of comparison is red pine of a given strength and elasticity, and the constants for various species of timber are derived from the mean results of experiments made principally by Professor Barlow.

Linear Tables for Facilitating the Calculations of Areas and Earthwork. By ARTHUR W. FORDE, C.E. T. W. Saunders, Charing-cross.

In the use of these tables the process of calculation is altogether mechanical. The lines and figures of which they are made up are drawn on cardboard, on which the author conceives that more dependence may be placed than on ivory or box-wood scales, so far as regards atmospheric influence, but whether he includes the influence of damp in general amongst the variations referred to, does not appear. Unquestionably, such tables are of a somewhat tender frame and texture, liable to other mischiefs besides mere atmospheric influences. An accidental crease, or blister from a drop of ink or other fluid, might easily involve irremediable damage. Nevertheless, to otherwise useful tables, such objections are by no means vital, and the author is of opinion that "the chance of mistake by the ordinary mode of computation is much greater than by using these tables." They are very delicately drawn, and the cardboard is firm and good. The accompanying explanation requires, of course, some careful study previous to practical use of the tables.

The Civil Engineers' and Surveyors' Companion and Assistant, in Setting out Slopes, Curves, Cuttings, and Embankments, with comprehensive Tables, &c. By EDWARD RYDE, Land Surveyor and Civil Engineer. Published by the Author, Upper Belgrave-place, Eaton-square.

Unfortunately *The Civil Engineers' and Surveyors' Companion* is likely to be more a companion in adversity than an assistant, as slopes and cuttings have most of them long since sloped and cut. It is to be hoped, however, that there may be another "good time coming." Meantime Mr. Ryde has, though somewhat tardily, or at least untimeously, made laborious and diligent use of past opportunities. The scheme and its development are, he states, purely and originally his own, and are indeed, he adds, of far too prolix and wearisome a nature to be likely to procure many competitors. Though tedious in developement, however, the tables are clear and concise in result, and worthy hence of procuring many purchasers, though few competitors. *Ex facie*, while of easy reference, they obviate entirely the necessity of calculation, so that the tedious complicated and difficult process of setting out slopes and curves by the existing system, may thus be simplified by tabular arrangement.

A Continuation of the Memoirs of a Working Man, illustrated by some original Sketches of Character. London: C. Cox, King William-street, Strand.

THE favourable reception given both by reviewers and by general readers to the "Memoirs of a Working Man," has naturally suggested a "Continuation" of them, in accordance with a desire expressed by readers to have what was wanting supplied, with more explicit details on some points in his history, formerly treated of within rather too modest dimensions. The tendency of the whole, in its probable influence on working men, is excellent, and we are inclined to think that a member of a class, if imbued with right principles himself, and capable of communicating these in attractive or even in merely intelligible language to his fellows, will constitute a potent and practical moral teacher. On the mere law of class imitation this will be so. The natural tendency of tribes possessed of common similitude in nature or in circumstance to imitate leading or current tribe examples, is well known, whether amongst men, women, or children, and not amongst human tribes alone. As to capability, the present author displays far more than an average power over his mother tongue. His style is fluent and correct, and even often elegant, though simple and unassuming, and thus it constitutes an admirable instrument in the hands of such a teacher, who will produce impressions all the deeper in the hearts of his fellow-workmen, that they have much to sympathise with, in the interesting narration of the teacher's personal and domestic troubles and anxieties,—"so like their own."

Miscellanea.

SMOKY CHIMNEYS.—The following cure for a smoky chimney of the olden time is taken from a book of receipts about 1580 (the spelling is modernised):—"*How to help Smoking Chimneys.*—If the chimneys be large, and carry some good length and breadth with them, then may you erect or build a false back and sides to your smoking chimneys, so as there may be a distance of three or four inches between the old back and the new: raise this new work a foot above the mantle-tree. Warranted by a gentleman of Ireland, being a great practiser in artificial conclusions. Qre."—W. P.

RAILWAY JOTTINGS.—It appears that light locomotives are likely to be useful not only on branch but on main lines of railway, as evidenced lately by a very successful series of experiments on the Edinburgh and Glasgow, with one of Messrs. England and Co.'s, of London. The dimensions of this engine are:—Cylinder, 9 inches diameter; stroke, 12 inches; driving-wheels, 4 feet 6 inches diameter; boiler, 2 feet 3 inches, with 109 tubes, 11 feet 4 inches long, and 1⅝ inches in diameter: entire weight, in full working order, about 10 tons. The engine is guaranteed to work trains of six carriages, with passengers, at the rate of 45 miles an hour, and ascend an incline not exceeding 1 in 100 at a proportionate rate of speed, with a consumption of coke not exceeding 10 lbs. per mile. In point of fact, for a fortnight past, it appears that two trips a day have been made with the express train, on 7 or 8 lbs. of coke per mile, and the distance easily run within an hour and a quarter, drawing six carriages, besides luggage-vans, &c. Part of the trip on Saturday last, says the *Glasgow Guardian*, "was made at the rate of 65 miles an hour, and there cannot be a doubt that Mr. England has, by this invention, put it in the power of railway companies very materially to economise the expense of management."——A survey of a new line from Hawick to Northallerton is in progress. This line, it is said, would shorten the distance from Edinburgh to London full 30 miles compared with the present route.——By a series of levellings made in the last four years over an extent of about 200 acres, where drainage is carried on at Chat Moss, it appears that a subsidence has taken place to the extent of one foot per annum. The Liverpool and Manchester line, as our readers may recollect, is laid on a floating foundation across this morass. ——A movement is in progress to urge the Bristol and Exeter Company to form a line from Bleadon to Wells, as authorised by their Act.——The Cork and Bandon Railway is carried across the Vale of Chetwynd by a viaduct of four large arches, 90 feet high. There are three viaducts on the line, and one tunnel, 900 yards in length: the cost, when all is completed, will be 252,000*l.*

ROYAL DUBLIN SOCIETY.—DISTRIBUTION OF PRIZES.—The prizes were last week distributed to the exhibitors of the best specimens of arts and manufactures: the principal are as follows:—Mr. John Heming, for Cambric dresses, first gold medal; Messrs. Telford, for large church organ in mahogany case (drawings by a pupil in Dublin School of Design), first gold medal. The second gold medals were awarded to Messrs. Atkinson and Co., for poplins, gold tissued, brocaded, &c.; Messrs. Fry, for striped and figured tabinets; Messrs. Pim Brothers and Co., for single figured and corded poplins; Messrs. John Holden and Co., for sewed muslin; Messrs. Lambert and Bury, for Limerick lace dress, &c.; Messrs. M'Donnel and Co., ream of 34lb. fine laid medium paper; Messrs. Elkington, Mason, and Co., electro-plated articles; Mr. Arthur Jones and Mr. W. G. Rogers, specimens of wood carving; Messrs. Grendon and Co., locomotive passenger engine and other machinery; Mr. Wilfred Haughton, railway friction buffer; Messrs. Courtney and Stephens, a patent double-acting platten letter-press printing machine, &c. The third gold medals were awarded to Messrs. Hatton and Smyth, for Balbriggan hosiery and loom at work; Messrs. Wilson and Son, hosiery and loom at work; Mr. T. Bennett, jewellery; Mr. Samuel Bradford, cutlery; Messrs. Cook and Sons, marquetrie; Mr. Nicholas Lombard, carving and gilding; Mr. Samuel Hudson, sadlery; Mr. De Groot, carving; Mr. Wm. Brown, a church finger organ in Gothic case; Mr. John Bray, double-action harp; Mr. John M'Neil, musical instruments; Mr. Saunders, gas cooking apparatus, &c.

ELECTRO-MAGNETIC MOTIVE POWER.—This long-looked for desideratum has been at last accomplished, if American authority is to be relied on. At the Smithsonian Institution (a respectable one, as our readers already know), Professor Page, it is said, has stated that there is no longer any doubt of the practicability of applying electro-magnetic power in place of steam. Heretofore length of stroke was wanted, but the Professor says he can make an electro-magnetic engine with a stroke of six, twelve, twenty, *or any number* of feet. Professor Page stated that he had reduced the cost so far that it was less than steam under many and most conditions, though not so low as the cheapest steam-engines. With all the imperfections of the engine, the consumption of 3lb. of zinc per day would produce one-horse power. The larger his engines, contrary to what has been known before, the greater the economy. *There were yet practical difficulties to be overcome..*

ST. LUKE'S, CHELSEA.—A rumour having gone abroad that the guardians, wisely, we think, had resolved, by a majority of one, to appoint a paid surveyor to assess the parish, a vestry has been held, and, by a majority of 112 to 10, a protest passed against such appointment, as in direct opposition to the opinions of the rate-payers.

THE NORTH LONDON ART-ARTIZAN SCHOOL is very fully attended, and appears in other respects to be progressing very favourably. Subscriptions, however, are needed, as the payments by the pupils do not cover the expenses. There are 200 scholars, and arrangements are being made to establish a female class, under supervision of a committee of ladies. Application has been made to the Board of Trade for the loan of additional casts—a favour, we suppose, that can scarcely be refused.

SALE OF THE KING OF HOLLAND'S PICTURES AT THE HAGUE.—THE distribution of this collection to pay the late king's debts, is much to be regretted. The Marquis of Hertford and the Emperor of Russia are amongst the largest buyers. For some of the paintings very high prices were obtained: one day's sale brought more than 50,000*l.* (Is the auctioneer paid a commission?), and the total realised is more than 100,000*l.* Amongst the most costly lots are "Christ at the Tomb," by Sebastian del Piombo, 2,333*l.*; the "Holy Family," by Raffaelle, 1,375*l.*; "La Vierge de Pade," by Andrea del Sarto, 2,520*l.*; "La Colombine," by Leonardo da Vinci, 3,333*l.*; "Leda," by the same, 2,041*l.*, and "Portraits of Philippe le Roy and Madame le Roy," by Vandyke, 5,300*l.* the two.

PUBLIC BATHS AND WASH-HOUSES.—The following return shows the number of bathers, &c., in the week ending August 17, at three out of the four London establishments for the labouring classes.

	Number of Bathers.	Receipts.	Number of Washers.	Number of Hours Washing.	Receipts.
		£. s. d.			£. s. d.
The Model Baths, &c. Whitechapel	4296	57 14 9½	284	605½	3 4 9
St. Martin-in-the Fields	6108	89 5 7	866	1611	7 6 0
St. Mary-le-Bone	5949	72 17 7	84	141	0 16 0

DECORATORS, ARCHITECTURAL MODELLERS, AND BUILDING-IMPROVERS should not omit to apply for space in the International Exhibition. There will be no chance of obtaining it if intimation be not given to the local committee before Oct. 31. England must do her best.

THE FIRE AT GRAVESEND.—The loss by this fire, as estimated by the surveyors of the London insurance companies, is 80,000*l.* The offices that will principally suffer are the following:—Kent Fire Office, 10,000*l.*; Globe, 8,000*l.*; Royal Exchange, 8,000*l.*; Alliance, 8,000*l*; Norwich Union, 7,000*l.*; Phœnix, 7,000*l.*; West of England, 5,000*l.*; Mutual, 2,000*l.*; Star, 1,000*l.*; Commercial, 2,000*l.*; total, 58,000*l.*

COOKING BY GAS.—A Southampton correspondent, Mr. John Elliott, claims the original idea of cooking by gas for Mr. Sharpe, the scientific manager of the Southampton Gas Works, who, he says, twenty years since publicly demonstrated the feasibility and practicability of thus applying gas to the process of cooking, and who thirteen years since carried his theories into practice. Mr. Elliott therefore thinks it is "too bad in 1850 to dispute this gentleman's right to the discovery which he perfected." Our correspondent, we suspect, however, is mistaken in supposing that any one is engaged, at this time of day, in claiming the idea of cooking by gas, unless it be Mr. Sharpe himself, of the merits of whose claim we know nothing. Cooking by gas we have ourselves seen in practice at Edinburgh at least fifteen years since. This may be a fitting time to remind the public of the claims of the originator, but others, so far as we can judge, are merely embracing the like opportunity of pushing their own special modes or manufactures into notice, without any design to claim the origin either of the idea or the practice. Mr. Sharpe is also said to have applied gas to heating baths many years since.

WATER FOR LAMBETH.—What has been done (practically) since last season to obtain a better supply of water, and of a pure quality, for the inhabitants of Lambeth and the whole of the south side of London, where it is proverbially bad—the supply being taken from the worst parts of that "common sewer" called the "river Thames?" I saw a plug opened this morning (*after* the supply had been sent in to the neighbours), and the water for some minutes was as *black* as the water of a foul cesspool: it will be no wonder if we soon hear of cholera in that neighbourhood. There seems to be great neglect somewhere, that a whole session should pass and *no* remedy *adopted*, after such a fearful mortality as was experienced in Lambeth last year. R. M.

GUILDFORD SEWERAGE.—SIR: It will be remembered by many of your readers that plans were called for by advertisement in your journal of December, 1848, for effectually draining the town of Guildford; and nineteen engineers sent in designs. After several weeks' delay, the *commissioners* engaged a government surveyor to assist them, and three plans were selected by him (for the commissioners to decide upon) as offering the greatest facilities for carrying out their intended object. Not less than sixteen months have passed over, and the successful competitor is not declared. Unable to settle the sewerage question, they have now a fresh scheme in view, that of erecting baths, having no other means of disposing of their money. Look out, ye competitors for baths and wash-houses, rush down and take the site of ground, send in your design, and you will have the gratification of waiting two or three years for an answer.

FAIR PLAY.

ST. MARGARET'S CHURCH, LEE.—A new organ of the first class, by Messrs. Bishop and Sons, has been erected in the parish church of Lee, near Blackheath. The case executed has been from a design by Mr. John Brown, the architect of the church (erected in 1841), by Messrs. Vincent and Burrell, Norwich: the decorations by Mr. St. Quintin.

WIDE ESTIMATING.—The following is another pretty specimen of estimating, for schools and school-house, Boughton Monchelsea, Kent, Messrs. W. G. and E. Habershon, Architects, who supplied the quantities:—

Tomlin, Leeds	£1143	0	0
Town, Boughton	755	0	0
Sutton and Walter, Maidstone	742	0	0
Thompson, Loose	700	0	0
Walker and Soper, London	689	0	0
Holloway, Maidstone	670	0	0
Assiter	660	0	0
Shadgate, Boughton	590	0	0

AN UNSUCCESSFUL COMPETITOR.

TENDERS

For two houses for Messrs. Adcock, Princes-street, Oxford-street; Mr. Meakin, architect.

Lee	£3,680
Piper	3,478
Mansfield	3,300
Haward and Nixon	3,133
Lawrence	3,088
Haynes and Co.	2,995
Trego	2,944

For a congregational church, Caledonian-road, Holloway; Mr. A. Trimen, architect.

Grimsdell	£2,842
Tombs	2,798
Haynes and Co.	2,766
Curtis	2,734
Piper	2,724
Mallet	2,715
Dove	2,700
Trego	2,687
Myers	2,488
Carter and Ellis	2,436

For training schools, Whitelands, Chelsea; Mr. H. Clutton, architect.

Curtis	£8,422
J. Anson	8,286
Carter and Ellis	7,873
Grimsdell	7,839
Kelk	7,780
Locke and Nesham	7,676
Holland	7,594
Piper	7,565
Wilson	7,423
Trego	7,268

TO CORRESPONDENTS.

"P. H. D."—Please send address, mislaid.

"G. A. S." (we are compelled to decline recommending books, as we state every week), "G. W.," "H. C.," "J. T.," "G. W., Jun." (we shall look into the work in question before long. An early volume of THE BUILDER contains a series of papers on hand-railing), "J. and J. P. H.," "C. R.," "A Recent Subscriber," "T. F. F.," "J. H. C.," "G. P." (we have not time to go into calculations. Such a building would probably cost 700*l*.), "J. M.," "J. P. W." (can you give some practical application), "J. J. L.," "A Subscriber," "W. L." (received), "C. B.," "G. J. R.," "B. O.," "Suggestions for Improving St. James's Park," "I. B." (we cannot agree with our correspondent in repudiating altogether French casements), "J. B." (publicity seems of no avail), "J. L." (not such as we can pay for), "R. N. T." (give notice as to articles for Exhibition of '51 to the local commissioners of the district. October 31st is the last day), "H. H.," "A Bishop," "E. B. E." (we are sorry we cannot advise), "W. C.," "D. de C." (declined with thanks); "Ploughing by Steam," by Lord Willoughby d'Eresby: London, Ridgway.

ADVERTISEMENTS.

DEFRIES' PATENT GAS BATH.—By the use of the above, a HOT BATH can be obtained in six minutes for less than twopence. Every family should provide itself with this invaluable requisite, its limited cost placing it within the means of all, and its simplicity within the management of a child.—DEFRIES' ECONOMIC GAS COOKING STOVES are adapted for all establishments, large or small, and need only to be seen to be appreciated for their cleanliness and economy, entirely dispensing with all coal. To be seen daily in operation (Saturday excepted) at 231, Regent-street, and also in action.—Defries' Dry Gas Meter, 40,000 in use. N.B. The apparatus can be applied for all heating purposes.

PUBLICATIONS.

NEWS! NEWS! NEWS!—The best, cheapest, and largest Newspaper in the world.—LLOYD'S WEEKLY LONDON NEWSPAPER contains sixty large columns of the latest intelligence from all parts of the globe, price only threepence, postage free. Send three postage stamps to E. LLOYD, 13, Salisbury-square, London, and receive one copy as a sample.

MR. THOMAS TATE'S NEW WORK.
Just published, in 8vo. price 5*s.* 6*d.* cloth,

ON the STRENGTH of MATERIALS; containing various original and useful Formulæ, specially applied to Tubular Bridges, Wrought Iron and Cast Iron Beams, &c.

By THOMAS TATE, of Kneller Training College, Twickenham, late Mathematical Professor and Lecturer on Chemistry in the National Society's Training College, Battersea; Author of "Exercises on Mechanics and Natural Philosophy," &c.
London: LONGMAN, BROWN, GREEN, and LONGMANS.

IMPROVEMENT AND DRAINAGE OF THE METROPOLIS.
Just published, price 1*s.*

SUGGESTIONS for a NEW STREET and AQUEDUCT SEWER through LONDON, and Remarks on the Bridges; with a Map and Section.
By NATHANIEL BEARDMORE, Member of the Institution of Civil Engineers, &c., &c.

By the same Author,
PRACTICAL TABLES to FACILITATE HYDRAULIC and OTHER CALCULATIONS. Revised edition, price, 7*s.* 6*d.*
Printed and published by WATERLOW and SONS, Parliament-street, Westminster.
WEALE, 59, High Holborn.

Two vols. octavo, with plates in folio, price 4*l.* 14*s.* 6*d.*
Proofs, 6*l.* 6*s.*

THE BRITANNIA and CONWAY TUBULAR BRIDGES, with General Inquiries on Beams, and on the Properties of Material used in Construction.
By EDWIN CLARK, Resident Engineer.
With the sanction and under the supervision of ROBERT STEPHENSON.
DAY and SON, 17, Gate-street, Lincoln's-inn-fields; and JOHN WEALE, 59, High Holborn.

THE ARCHITECTURAL QUARTERLY REVIEW. Preparing for publication. Prospectuses may be now obtained from the publisher. Letters for the Editor, and books, drawings, models, and specimens, to be addressed to the care of the publisher,
GEORGE BELL, 186, Fleet-street.

Now publishing,
THE CHURCHES OF THE MIDDLE AGES.
By HENRY BOWMAN and JOSEPH S. CROWTHER, Architects, Manchester.

To be completed in Twenty Parts, each containing six plates imperial folio. Issued at intervals of two months. Price per part to subscribers—proofs, large paper, 10*s.* 6*d.*; tinted, small paper, 7*s.*; plain, 7*s.* 6*d.* Parts I. to IX. are now published, and contain illustrations of Ewerby Church, Lincolnshire; Temple Balsall Chapel, Warwickshire; Heckington Church, Lincolnshire; Cley Church, Norfolk; and Threekingham Church, Lincolnshire.

"Ewerby is a magnificent specimen of a flowing middle-pointed church. It is most perfectly measured and described: one can follow the most recondite beauties of the construction, mouldings, and joints in these plates, almost as well as in the original structure. Such a monograph as this will be of incalculable value to the architects of our Colonies or the United States, who have no means of access to ancient churches. The plates are on stone, done with remarkable skill and distinctness. Of Heckington we can only say that the perspective view from the south-east presents a very vision of beauty; we can hardly conceive anything more perfect. We heartily recommend this series to all who are able to patronize it."—*Ecclesiologist*, Oct. 1849.
London: GEORGE BELL, 186, Fleet-street.

WITH TRAVELLING MAPS AND PLANS.
MR. MURRAY'S HANDBOOKS.
The entire Series may be had.

1. HANDBOOK of TRAVEL-TALK. 5*s.*
2. HANDBOOK of NORTH GERMANY and the RHINE. 12*s.*
3. HANDBOOK of SOUTH GERMANY and the TYROL. 12*s.*
4. HANDBOOK of GERMAN and DUTCH PAINTING. 12*s.*
5. HANDBOOK of SWITZERLAND and the ALPS. 10*s.*
6. HANDBOOK of FRANCE and the PYRENEES. 12*s.*
7. HANDBOOK of SPAIN and ANDALUSIA. 16*s.*
8. HANDBOOK of FRENCH and SPANISH PAINTING. 12*s.*
9. HANDBOOK of NORTH ITALY and FLORENCE. 12*s.*
10. HANDBOOK of CENTRAL ITALY and ROME. 16*s.*
11. HANDBOOK of MALTA and the East. 15*s.*
12. HANDBOOK of EGYPT. 15*s.*
13. HANDBOOK of NORTH EUROPE. 24*s.*
14. HANDBOOK of LONDON. 16*s.*

Also, next week,
15. HANDBOOK of DEVON & CORNWALL.

JOHN MURRAY, Albemarle-street.

THE ART-JOURNAL. No 146, for September, contains THREE ENGRAVINGS on STEEL, from pictures in the Vernon Gallery—"The Countess," engraved by R. A. Artlett, after Sir T. Lawrence, P.R.A.; "The Port of Leghorn," engraved by J. C. Bently, after Sir A. W. Callcott, R.A.; "A Highland Cottage," engraved by C. Cousen, after A. Fraser. Also a large number of finely-executed Engravings on Wood.

Among the Literary Contents will be found "Modern Moves in Art," by R. N. Wornum; "The Exhibition of 1851, and the Westminster Local Committee;" "The British Association at Edinburgh," by Robert Hunt; "Autobiography of John Burnett," with a Portrait; "Visits to the Manufacturing Districts—Derby," Illustrated; "Copyright of Design Amendment Act;" "The Project of the United States regarding the Exhibition of 1851;" "Dictionary of Terms in Art;" "The Goldsmith's Work of M. Morel," Illustrated; "An Account of Samuel Cooper, Miniature Painter to Cromwell and Charles II.;" "Art in America;" "Monachism in Art," &c. &c.

G. VIRTUE and Co. 25, Paternoster-row.

CHEAP GLASS.—Good Sheet cut to any size, 2*d.* per foot; Superior, for prints, 3*d.*; Ornamental, 9*d.*, at HICKSON'S, 46, Long Acre (cash).

CHEAP ORNAMENTAL GLASS.—I beg to inform my friends and the public, that I have now completed a new ENGINE, and, owing to the facility with which I can execute orders, I am enabled to reduce my former prices considerably. The prices are now from ONE SHILLING PER FOOT SUP., and borders from SIXPENCE PER FOOT RUN. A large quantity of the cheapest patterns always in stock. Embossing and painted work on the most moderate terms.—CHARLES LONG, No. 1, King-street, Baker-street, Portman-square.—Cash only.

E. and W. H. JACKSON beg to call the attention of Builders and the trade to the low prices of their PATENT PLATE GLASS. BRITISH PLATE, silvered and for glazing, of unrivalled quality and finish. ROUGH PLATE, CROWN, SHEET, COLOURED, and ORNAMENTAL GLASS, in every variety, of the best manufacture, and at the lowest terms. List of prices, estimates, and every information sent on application. THE ROYAL ARMS, richly painted on glass,—size, 86 inches by 58,—well adapted for a public Company's Hall; to be seen at their warehouse, 315, Oxford-street.

SOHO PLATE, CROWN, SHEET, PATENT PLATE, and ORNAMENTAL GLASS WAREHOUSE, 26, Soho-square, and George-yard, Crown-street, Soho.—ALFRED GOSLETT begs to inform architects, builders, &c., that he is now supplying Belgian Sheet Glass, of large size and very good quality, at 42*s.* the case of 200 feet (case included), ornamental glass of very superior designs cut to order from 9*d.* per foot; and that he is prepared to contract for the supply of all descriptions of crown, sheet, patent plate, coloured and ornamental glass, either in crates, as manufactured, or cut to given size.

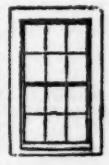
THOMAS MILLINGTON begs to inform BUILDERS and the Trade that he can supply them with FOREIGN and ENGLISH WINDOW GLASS, Plain and Coloured, of every description. ROUGH PLATE-GLASS from ¼ inch to 1 inch thick. Glass Pantiles, Slates, &c. &c. White Lead, Paints, Colours, Oils, Varnishes, Brushes, &c.; Milled and Sheet Lead; Lead Pipe from ¼ inch to 4½ inches bore; Solder, Water-closets, Basins, Plumber's and Brass Work of every description, and upon the very best terms. Glass Ornament Shades, Milk-pans, Propagating and Bee Glasses.—Address, 87, Bishopsgate-street Without.

See Priced List Advertisement, Saturday, June 15.

CRYSTAL PLATE LOOKING-GLASSES. The CRYSTAL PLATE GLASS is a new manufacture of peculiar brilliancy and substance, and when silvered (being perfectly colourless), produces a most startling effect. Until this article was introduced, a pure colourless reflection had never been obtained. On receipt of eight stamps specimens will be forwarded; printed sheets of designs and estimates free. For shop fronts, where a clear sight is important, this glass proves invaluable. WM. FOLLIT, SOLE AGENT, 63, Fleet-street, corner of Bouverie-street, London, Manufacturer of Picture Frames, Window Cornices, and every description of superior Carving and Gilding, at a reduced scale of prices. From the extent of his business, and the strict economy in the conduct thereof, W. F. is enabled to offer many advantages, unattainable at other establishments. Important to Artists, Upholsterers, Builders, Shippers, and the trade.

CHAS. WM. WATERLOW,
MANUFACTURER

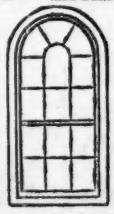
of Sashes and Frames, and Joiner to the Trade, 121, Bunhill-row, Finsbury-square.—Well-seasoned materials, superior workmanship, lowest prices.—Upwards of 400 DOORS, and a large variety of Sashes and Frames, always on sale. Glazed goods securely packed for the country. Steam-struck Mouldings in any quantity.—N.B. This Establishment is worth the notice of all engaged in building.

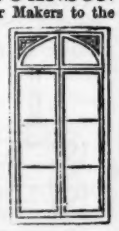


NOTICE OF REMOVAL.—JOHNSON and PASK, Sash, Shop Front, and Door Makers to the Trade, beg to inform their Customers and the Public generally, that they have removed to more extensive premises, in

BAKER-STREET, BAGNIGGE WELLS-ROAD;

where they have convenience for carrying on a larger business.





N.B. By inclosing a postage stamp, a full list of prices may be had by return of post.

PAPER-HANGINGS at E. T. ARCHER'S Manufactory for English, and Warehouse for English and French Paper-hangings, and all materials connected with the trade. The Panelled Decorations are fitted up on the walls of an extensive range of show-rooms, giving at one view a drawing or dining-room furnished fit for occupation.

LIST OF PRESENT PRICES.

Painted marble, granite, and oak papers	1*d.* per yard.
Superior bed-room papers.....	1*d.* "
Satin ground papers for bed-rooms, drawing and dining rooms.....	3*d.* "
Flock papers on grounds, and crimson flock on oak	4*d.* "
Bronze drawing-room papers	9*d.* "
Rich gold paper	1*s.* 6*d.* "
Ditto and Flock	2*s.* 0*d.* "

10,000 feet of gilt mouldings always in stock.
E. T. ARCHER, 451, OXFORD-STREET, LONDON.
January, 1, 1850.

PAPER-HANGINGS.—COTTERELL, BROTHERS, No. 500, New Oxford-street, London, invite the attention of Architects and Builders to their superior and important collection of FRENCH and ENGLISH PAPER-HANGINGS. The stock, which is very extensive, embraces every description of paper-hangings, from the simplest to the most finished in use, and will be found in chaste design and harmonious colouring well adapted to the improving taste of the public, and at prices quite in accordance with the economical spirit of the times. The specimens of panel designs, or decorations for walls and ceilings, are well worth the inspection of persons of taste; by novel arrangement they are fitted so that the finished effect of a room may be seen at a glance; strict attention is paid to architectural propriety and harmonious combinations of form and colour, often so lamentably deficient in this class of designs. The show-rooms are constantly open to visitors, at 500, New Oxford-street, London; and in the west of England, at Bristol and Bath.

REDUCED PRICES.—EDWARD SIMMS (late William Cleave), of Wilton-road, Pimlico Basin, begs to acquaint Builders and the Trade that he has now on hand, at his Manufactory (the first of its kind ever established), a very large Assortment of Dry and Well-seasoned OAK and DEAL PREPARED FLOORING BOARDS and MATCH BOARDING of all sorts, from ¾ inch to 1¼ inch thick, planed to a parallel width and thickness, and at greatly Reduced Prices. Also, Timber, Deals, Oak Planks, Scantlings, Sash Sills, Mouldings prepared by Machinery, Laths, &c.—Apply at E. SIMMS'S (late W. Cleave's) Flooring Manufactory, Wilton-road, Pimlico Basin.

FLOORING.—ALFRED ROSLING begs to inform his customers and the trade generally, that he has again very materially REDUCED the PRICES of his DRY FLOOR BOARDS, of which he has in stock an extensive assortment. To purchasers of a quantity of freshly prepared boards A. R. is able to offer a great reduction upon his current prices, to avoid the expense of piling away in the drying sheds. Mouldings in great variety, and prepared in a very superior manner.—Southwark-bridge Wharf, Bankside, October, 1849.

THOMAS ADAMS, Mahogany and Timber Merchant, Bermondsey New-road, Southwark, near the Bricklayers' Arms, is SELLING SEASONED FLOORING at LESS PRICES THAN ANY ADVERTISED; also matched boards and mouldings prepared from the very best material, and in a superior manner. Cut deals and scantling of every dimension; mahogany, cedar, rosewood, wainscot, elm, beech, oak, &c.; pantile, oak, and fir laths; wheelwrights' goods. All sawn and prepared goods (except timber) delivered free of expense. Sawing charged at mill prices. Very extensive drying-sheds.

N.B. English timber taken in exchange for foreign.

PRESENT PRICES of SEASONED FLOORING, prepared by improved Machinery. Net cash.

1¼ in. yellow, per sq.	20*s.* 0*d.*	1 in. spruce, per sq.	13*s.* 0*d.*
1 " " "	17*s.* 6*d.*	¾ " " "	11*s.* 9*d.*
1¼ " " "	14*s.* 9*d.*	½ " " "	10*s.* 6*d.*

Widths measured after being wrought. Quantities not less than thirty squares delivered within 5 miles free.

SAMUEL ARCHBUTT and CO., Timber Merchants, Sawing and Planing Mills, King's-road, Chelsea.

GEORGE HORATIO WILKINSON, Timber and Mahogany Merchant, 188, High-street, Shoreditch, nearly facing the terminus of the Eastern Counties Railway, has always on hand a large stock of PREPARED FLOORING BOARDS, in every variety and thickness, well seasoned and ready for use. Timber and deals of all descriptions at the lowest possible prices; also mahogany, rosewood, and other hard woods in logs, plank, board, and veneers, in condition for immediate use. No charge for delivery to any of the railway stations.

OAK TIMBER of ENGLISH GROWTH, cut to any size and scantling, delivered in any part of London at from 3*s.* per foot cube. Estimates given for any quantity, and the trade supplied.—Apply to RD. MAY, 90, Leadenhall-street.

MUIR'S PATENT

PLANING MACHINE.

SAW MILLS, GILLINGHAM-STREET, PIMLICO.

TIMBER of any size, **PLANK, DEALS,** and BATTENS, &c., Sawn on the most approved principle, Boards, &c., Prepared, Matched, and Grooved, by Muir's Patent Machinery. The Mills have all the advantages of navigation and water-carriage, being connected with the Thames by the Grosvenor Canal. Goods fetched from the docks and carted home free of charge.

Address to HENRY SOUTHAM,
Saw Mills, Gillingham-street, Pimlico.

N.B. Estimates given for Sawing and Planing.

GENERAL WOOD-CUTTING COMPANY.—SAWING, PLANING, AND MOULDING MILLS, Belvedere-road, Lambeth, between the Suspension and Waterloo Bridges. SAWING and PLANING in all their branches executed with the greatest despatch and punctuality. A large Stock of seasoned and beautifully WORKED MOULDINGS, consisting of upwards of 100 different patterns kept constantly on hand; also an extensive assortment of dry prepared FLOORING BOARDS, of all qualities and at reasonable rates.

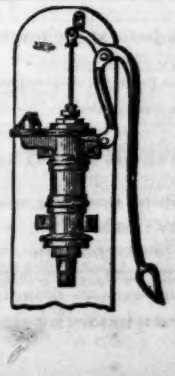
PHILLIPS, ALLCARD, and CO.'S IMPERIAL DEAL SAW-MILLS, WENLOCK-ROAD, CITY-ROAD, beg to invite the attention of builders, carpenters, and the trade, to their well selected stock, consisting of a large assortment of TIMBER, DEALS, PLANKS, and BATTENS, of every description, and thoroughly seasoned. They also have constantly on hand, and ready for immediate use, white and yellow prepared FLOORING BOARDS of all thicknesses, and matched lining, cut and planed to a parallel breadth and thickness. And they are enabled to offer all their goods at very moderate prices.

LADDERS, BARROWS, &c. for SALE or HIRE.—G. ELL invites the attention of Builders, Contractors, Decorators, and the trade generally, to the large Stock of Ladders, Barrows, Machines, Trestles, Steps, &c., he has always on hand in every way suited to their various purposes. Excavators' barrows at 9*s.*, 12*s.*, and 14*s.* per barrow complete. Ladders, Steps, &c. equally low. For particulars see printed lists, which can be had upon application.—Manufactories, Nos. 3 and 6, Tottenham-court, New-road, St. Pancras.

OLD FEATHER BEDS are dressed and purified by STEAM, with Patent Machinery. This new process of dressing not only removes all impurities, but by expanding the feathers the bulk is increased, and consequently the bed rendered much fuller and softer. Charge for dressing 3*d.* per lb. Old and mothy mattresses effectually cured and remade. Fetched and returned within five miles.—HEAL and SON'S list of bedding, containing all particulars of weights, sizes, and prices, sent free, by post, on application at their factory, 196 (opposite the chapel), Tottenham-court-road.

TO ARCHITECTS, BUILDERS, AND BRICK-MAKERS.
PUMPS of Superior CONSTRUCTION, bored perfectly true by improved machinery, in various plain and ornamental patterns for Conservatories, Squares, Market Places, Roads, Gardens, and for Liquid Manure. BRICK-MAKERS' PUMPS, in Wrought and Cast Iron, HYDRAULIC LIFT PUMPS, and ENGINES for Wells of any depth. SINGLE and DOUBLE PUMPS up to twelve-inch bore, kept for Hire.

BENJ. FOWLER (late of 63, Dorset-street), removed to the new Factory, Whitefriars-street, Fleet-street.



TO BUILDERS AND PLUMBERS
THE attention of the Trade is called to
JOHN WARNER & SONS' PATENT VIBRATING STANDARD PUMP,
which is recommended for the simplicity of its construction, and the ease with which it works.

By the introduction of the vibrating standard the cumbrous carriage and expensive slings and guides are unnecessary, rendering the price considerably less than pumps made on the old plan.

Beer and Water Engines for raising fluids from a depth not exceeding 25 feet; also, Garden Engines constructed on the same principle.

JOHN WARNER & SONS,
8, Crescent, Jewin-street, London,
Manufacturers and Patentees.

FULKES' RANGE and STOVE MANUFACTORY, and Builders' Ironmongery Warehouse, 91 and 92, Park-street, Camden-town.—An extensive stock of ranges, bright and black registered stoves, rain-water pipes and guttering, sash-weights, and all kinds of builders' ironmongery, at same prices as advertised by other houses.

TO BUILDERS AND CARPENTERS.

HAYWARD, BROTHERS, late R. HENLY and CO., WHOLESALE IRONMONGERS and SMITHS, 192, Blackfriars-road, and 117 and 118, Union-street, Borough.

Elliptic Stoves from 2½d. per inch. Register ditto, from 5d. ditto.

2	2½	3
Cast Rain-water pipe 9d.	10d.	1s. 1d. per yard.

1½	2½	3
Best Sheet Floor Brads, 11s. 6d. per cwt.		Cast Lath, 10s. ditto.

1½	2	2½	3
Best Cut Clasp,	14s. 0d.	12s 6d.	12s. 0d. per cwt.

No. 4	5	6
Best Patent Sash-line,	7s 0d.	8s. 0d. 10s. 6d. per gross.

6 in. 3-bolt Rim Locks, with Scotch springs, best brass fur. and patent spindles, 15s. per doz.

6 in. 3-bolt ward Round Mortise, with best fur. and patent spindles, 9s. 9d.

TO BUILDERS and CARPENTERS.—

Elliptic Stoves, double backs, 2½d. per inch.

Register Stoves, 5d. 6d. 6½d. 7½d. per inch.

Self-acting Ranges, with circular ovens and back boilers, best wrought bars and bright fittings—

3 ft., 2l. 18s. 3 ft. 6 in., 3l. 7s. 4 ft., 3l. 15s.

3-feet Cottage Ranges, with ovens and back boilers, 33s. each.

3-feet self-acting ditto, ditto ... ... 35s. each.

Air Bricks, 3s. 6d. per doz.—1-inch Cut Lath Nails, 13s. 6d. per cwt.

Best Patent Cut Clasp.				
1½	1¾	2	2½	3 inch and larger,
14s. 6d.	14s.	13s.	12s. 6d.	12s. per cwt.

Best Sheet Floor Brads, 11s. 6d. per cwt.

Best Town Glue, 38s. Ditto, Scotch, 52s. per cwt.

Best Patent Sash Line.					
1	2	3	4	5	6
4s.	4s. 6d.	5s. 6d.	7s.	8s.	10s. 6d. per gross.

At P. R. WILLIAMSON'S IRONMONGERY and STOVE WAREHOUSE, 35, Chiswell-street, Finsbury-square.

Lists of Prices had on application at the Warehouse, or by letter pre-paid, inclosing postage stamp.—Warehouse closes at 7 o'clock.

CLARK and HUNT'S IRONMONGERY, STOVE and METAL WAREHOUSE, 159, Shoreditch.

Strong Elliptic Stoves, with extra back, 2½d. per inch.

Register Stoves, 5d. per inch.

3-ft. Self-acting Cottage Ranges, with Oven and Boilers, 30s. each.

3-ft. Self-acting ditto, with wrought bars and bright fittings, 38s. ea.

2	2½	3 inch.
Cast Rain-water Pipe	8d.	10d. 1s. per yard.

Cast Gutters—4 inch, 8d. per yard.

4	4½ inch.
O.G. Gutters	11d. 1s. per yard.

1½	2	2½	3 inch.
Best Cut Clasp and Rose	13s.	14s. 6d.	14s. 15s. 12s. 6d. per cwt.

Sheet Floor Brads, 11s. 9d. per cwt. Cast Lath, 9s. 6d.

1-inch Cut Lath, 14s. per cwt.

6-inch 2-Bolt Rim Locks, with Scotch Springs and best Furniture Patent Spindles, 15s. per doz.

6-inch 3-Bolt Rd. Ward Mortice, with best Furniture and Patent Spindles, 9s. 9d.

Light Elliptic and Register Metal, 12s. per cwt.

Hot Water Pipes, 8s. 6d. per cwt.

GRICE'S IRONMONGERY, STOVE, and RANGE WAREHOUSE, 18, Walworth-road, London.

Elliptic Stoves, with Double Backs, 2½d. per inch; Register Stoves, 5d. per inch.

2-feet Self-acting Cottage Ranges, Oven and Back Boiler, 35s. each.

Cut Sheet Floor Brads, 11s. 9d. per cwt.

Cut Clasp Nails.				
15s.	14s. 6d.	14s.	13s.	12s. 6d. cwt.
1½	1¾	2	2½	3 in.

1-inch Cut Lath, 13s. 9d. per cwt.

6-inch 2-bolt Rim Locks, with Scotch Springs, best patent furniture, 14s. 6d. per dozen.

Improved Bow Latches, 6s. 6d. per doz.

HOT WATER APPARATUS for heating greenhouses, &c., on improved principles, being the cheapest heat known.

TO BUILDERS, CABINET-MAKERS, and OTHERS.

Best Cut Sheet Flooring Brads, 11s. 6d. per cwt.

Fine Cut Clasp and Rose.

1½	1¾	2	2½	3 in.
14s. 6d.	14s. 6d.	13s. 6d.	13s.	12s. 6d. per cwt.

Cross Garnet Hinges, per dozen pair.

2s. 9d.	3s. 6d.	4s. 3d.	5s.	6s.	8s.
10	12	14	16	18	20 in.

Best Bright Tower Bolts, per doz.

1s. 3d.	1s. 7d.	2s.	2s. 6d.	2s. 10d.	3s. 3d.	3s. 7d.
3	4	5	6	7	8	9 in.

Iron Rain-water Pipe.

9d.	10d.	1s. 1d.	1s. 5d.	1s. 8d. per yard.
2	2½	3	3½	4 inch.

Best London Glue, 38s. per cwt.

Cast Lath Nails, 10s. per cwt.

Air Bricks, 3s. 6d. per doz.

Hooping for bond, 3l. 10s. per ton.

Sash Weights, 5s. per cwt.

TERMS—NET CASH.

A price-list may be had on application.

A. L. PFEIL and Co.,

Wholesale Ironmongers, Brass Foundry and Nail Warehouse,

5 and 6, Broad-street, Bloomsbury, London.

AGENTS FOR LEA'S PATENT MORTISE LOCKS AND BOLTS.

TO BUILDERS AND CARPENTERS, &c.

J. H. BOOBBYER and CO., late Sturch and Boobbyer, Ironmongery, Brass Foundry, Nail, and Tool Warehouse, No. 14, Stanhope-street, Clare-market, London, for the supply of Carpenters, Builders, Cabinet-makers, Upholders, &c., at wholesale prices.

Best Cut Sheet Flooring Brads, 11s. 6d. per cwt.

Fine Cut Clasp and Rose.

1½	1¾	2	2½	3 inch.
14s. 6d.	14s. 6d.	13s. 6d.	13s.	12s. 6d. per cwt.

Best Bright Tower Bolts.

3	4	5	6 inch.
1s. 3d.	1s. 7d.	2s. 2d.	2s. 6d. per dozen.

Best Patent Sash Line.

No. 1	2	3	4	5	6
4s.	4s. 6d.	5s. 6d.	7s.	8s.	10s. 6d. per gross.

Cast Lath Nails, 10s. per cwt. Sash Weights 5s. per cwt.

Air Bricks, 3s. 6d. per dozen.

DR. ARNOTT'S VENTILATORS.

11 by 8 inches ..... 8s. each.

16 by 9 " ..... 8s. "

An assortment in Brass, Bronzed, Gilt, &c.

An extensive stock of Mortise Locks, Drawback Locks, Iron Rim Locks, and Latches, of every description, at very reduced prices; also Door Furniture, in china, amber, crystal, ivory, ebony, buffalo, horn, brass, &c., with Finger-plates, Bell-pulls and Levers *en suite*.

B. and Co. are the inventors of SHIFTING BOLT MORTISE LOCKS, &c., so universally approved of.—Established nearly 200 years, for the supply of goods from the best manufactories at the lowest prices.

STOVE GRATES.—The best and cheapest Grate for all useful purposes, is

PIERCE'S UNIVERSAL FIRE-LUMP GRATE,

made of the finest prepared Fire Loam in one entire piece; very strong, with large Hobs, Improved Iron Bars, Bolt in, and Trivet complete; will burn either Wood, Coal, Coke, or Peat.

Price 11s. 6d. and 12s. 6d.

Also, his

IMPROVED REGISTERED COTTAGERS' GRATES,

on the same principle, but adapted for warming two rooms, with one small fire.

This grate is constructed so as not to require any fixing or brick-work, and was exhibited at the agricultural shows of the present year, when it was highly commended.

Prices—22s. 6d.; 25s.; 27s.; and 30s.

May be seen at

PIERCE'S PYRO-PNEUMATIC STOVE-GRATE MANUFACTORY, 5, JERMYN-STREET, REGENT-STREET.

"A Cottagers' Grate, on one of the best principles we ever saw, shown by W. Pierce, was both cheap and compact."—*Exeter Western Times*, July 20, 1850.

*** Old Stoves modernised, and altered to the above principle.

PROTECTION from FIRE, and GREAT ECONOMY in BUILDING.—A pamphlet, descriptive of the method by which both these important objects are secured, may be obtained on application to Messrs. FOX and BARRETT, 46, Leicester-square.

WARMING BY HOT WATER.—J. WEEKS and Co., KING'S-ROAD, CHELSEA, solicit the honour of Architects to inspect their Hot-Water Apparatus, which is to be seen on their premises, in extensive operation. Ornamental Pedestals and Stacks of Pipes in great variety, applicable for warming churches, mansions, entrance-halls, offices, conservatories, &c.—TUBULAR BOILERS of all sizes, warranted to be the most efficient and economical of any yet introduced.—J. WEEKS and Co., Hot-Water Apparatus Manufacturers, King's-road, Chelsea.

PATENT GALVANIZED IRON, Plain or Corrugated, for ROOFS, HOUSES, &c. Wholesale, Retail, and for Export.

Apply to TUPPER and CARR,

3, MANSION-HOUSE PLACE, LONDON;

or BROAD-STREET, BIRMINGHAM,

Patent Galvanized Iron Guttering,

Water or Gas-pipes, Hooping, Wire, &c.

*** An allowance to the trade.

IRON BUILDING and ROOFING WORKS,

BIRMINGHAM, late of Southwark.

JOHN H. PORTER,

Manufacturer of the Corrugated and other kinds of Iron Roofing for railway stations, carriage sheds, farm buildings, gas-works, warehouses, factories, &c. &c.

PATENTEE

Of the Corrugated Iron Beams, Girders, and Fire-proof Floors.

IRON FOUNDRY, 80, Goswell-street (late of Brick-lane, St. Luke's).—J. J. JONES having made great additions to his STOCK of PATTERNS, begs to inform the Trade, that he can now supply them with Plain and Ornamental Iron Columns, Girders, Railings, Gates, Iron Coping, Balconies, Window Guards, Verandahs, Ornamental Staircase Panels, Iron Staircases, Tomb Enclosures, Trellis Panelling, Lamp and other Brackets, Cantilevers, Newel Bars, Water Closet Work, Area Gratings, Fly and other Wheels, Wheel Plates, &c.

BAKERS' OVEN WORK, Forge Backs and Troughs, Rain Water Pipes and Gutters, Sash Weights, Furnace Bars, Stoves, Ranges, &c., always in stock.

FOUNDRY AND IRONWORKS,

128, DRURY-LANE, and CHARLES-STREET, DRURY-LANE,

GLOVER, BROS.,

Solicit the attention of the Trade to their extensive Stock of PATTERNS for CASTINGS of EVERY DESCRIPTION, either structural or ornamental.

Patterns of Girders, Columns, Balconies, Railing, Ornamental Carriage and Park Gates, Lamp and Street Posts, Tanks, Pipes, Wheels, Pinions, Lathes, and Steam-engines; Range and Hot-plate Metal. An improved Soot Door adapted for internal work.

A large stock of Rain-water Pipes, Plain and O G Gutters, Air-bricks, Sash Weights, Air-tight Sewer Grates, Stable Fittings, Hurdles, &c.

Plain and Ornamental Vases 20 per cent. cheaper than Terra-cotta.

Estimates given for Iron Buildings, Wrought-iron Roofing, Greenhouses, Staircases, Wrought-iron Girders, Fireproof Doors, Book Safes and Strong Rooms, Tanks and Boilers and every description of ironwork to specification, and the work executed with every attention to quality and despatch.

GLOVERS' IRONWORKS,

168, DRURY-LANE, and CHARLES-STREET.

TO BUILDERS AND OTHERS.

HART and SONS, Wholesale and Manufacturing Ironmongers, Nos. 53, 54, and 55, Wych-street, Strand. Established 1819. Proprietors and sole Manufacturers of PITT'S PATENT SELF-ADJUSTING DOOR FURNITURE and SPINDLES, and Manufacturers of Dr. ARNOTT'S VENTILATING CHIMNEY VALVES.

HART and SONS solicit the attention of Builders, House Decorators, Smiths, Bell-hangers, &c. &c. to their extensive and well selected stock of DOOR FURNITURE in every suitable material, *en suite* with finger-plates, bell-pulls, levers, &c., and also to their

LOCKS and LATCHES in mortice, rim, drawback, iron gate, cabinet &c., of all qualities, including Barron's, Bramah's, Chubb's, and Pitt's Patent.—To their

GENERAL IRONMONGERY, wrought and cut nails, screws, hinges, bolts, &c. &c.

BRASS FOUNDRY.—Bell cranks of all descriptions, cornice poles, picture rods, skew door handles, desk and hat rails, window guards, Espagnolette bolts, &c. &c.

WINDOW FITTINGS of all kinds, including brackets, rods, arms, sliding sockets, trays, &c. &c.

DOOR SPRINGS and HINGES, including Redmund's, Smith's, Collinge's, Gerish's, and Cotterell's patents.

WINDOW BLIND FITTINGS of the most approved principle.

LEA'S RACK BOLT MORTICE LOCKS, for which they are AGENTS, as well as for all inventions of merit as soon as perfected.

HART and SONS, aware that the practice of publishing NET price-lists is injurious to the interests of the trade generally, are unwilling to follow it, but at the same time they beg to assure their friends that their prices shall be equally as low as those of any other respectable house.

CHUBBS' LOCKS, FIRE-PROOF SAFES, AND CASH BOXES.

CHUBBS' PATENT DETECTOR LOCKS give perfect security from false keys and picklocks, and also detect any attempt to open them. They are made of all sizes, and for every purpose to which locks are applied, and are strong, secure, simple, and durable.

CHUBBS' PATENT LATCH, for front doors, counting-house doors, &c., is simple in construction, low in price, and quite secure. The keys are particularly neat and portable.

CHUBBS' PATENT FIRE-PROOF SAFES, BOOKCASES, CHESTS, &c., made entirely of strong wrought-iron, so as effectually to resist the falling of brick-work, timber, &c., in case of fire, and are also perfectly secure from the attacks of the most skilful burglars.

CHUBBS' CASH and DEED BOXES, fitted with the Detector Locks.

CHUBB and SON, 57, St. Paul's Churchyard, London.

LEADBEATER, FIREPROOF SAFE and DETECTOR LOCK MANUFACTURER to HER MAJESTY'S BOARD of ORDNANCE.

LEADBEATER, many years Manufacturer for Chubb.

LEADBEATER'S strong wrought-iron FIREPROOF BOOK SAFES, CHESTS, DOORS for STRONG ROOMS, PLATE CLOSETS, PARTY WALLS, &c., all of the best make, secured by LEADBEATER'S IMPROVED DETECTOR LOCKS, and possessing all the most recent improvements, afford PERFECT SECURITY against Fire and Thieves. Extra Strong Cash and Deed Boxes, &c., sold at prices which place them within the reach of all classes.

LEADBEATER'S IMPROVED DOUBLE-ACTION COMBINATION LATCHES, for securing street and office doors, cannot be opened by false keys or picklocks.

A large assortment on hand of all sizes and fitted for every purpose at LEADBEATER'S FIREPROOF SAFE and DETECTOR LOCK MANUFACTORY, 125, ALDERSGATE-STREET, CITY, LONDON.—Estimates sent by return of post.

A vacancy for an apprentice—a small premium required.

REVOLVING SAFETY WOOD AND IRON SHUTTERS.—SNOXELL, Patentee, 96, Regent-street, and at his steam-works, 135, Old-street. These shutters have fully borne out their superiority over other revolving shutters for security, durability, and simplicity. References can be given to noblemen whose mansions are fitted herewith, and numerous large establishments, where some are fixed measuring upwards of 400 square feet in one shutter, and which are opened and closed in a few moments with the greatest possible ease, without the use of machinery. The Patentee manufactures Brass Sash Bars, Stall Board Plates, &c.

REVOLVING SHUTTERS.—CLARK and Co. invite the attention of architects and builders to their improvements in REVOLVING SHUTTERS of IRON or WOOD. Having completed new and improved machinery for the manufacture of revolving shutters, they are enabled to offer a superior article at a reduced price. Manufacturers of improved DRAWN ORNAMENTAL METALLIC SASH BARS, brass mouldings, stall-board plates, door-plates, &c. Engraving in the first style of workmanship.—Messrs. CLARK and Co. having fixed some hundreds, will feel a pleasure in forwarding the testimonials of architects and others having them in use, on application. Steam engines, saw benches, and machinery of every description, and iron-work connected with buildings, planing, boring, and turning.—CLARK and Co., Engineers, Tunnel Iron Works, 338, Wapping, London

BUNNETT and Co., ENGINEERS,

Patentees and Manufacturers of

REVOLVING IRON AND WOOD SAFETY SHUTTERS,

and of

ORNAMENTAL SASH BARS, MOULDINGS, STALL-PLATES, &c.,

FOR SHOP-FRONTS, AND OTHER WINDOWS, OR SKYLIGHTS,

IN BRASS, COPPER, ZINC, IRON, &c.

Shop-fronts completely fitted up and glazed with best plate glass. Metal works and improved machinery of all kinds for warehouses, banking-houses, &c.

BUNNETT and Co. challenge competition as to either quality or price.

Office, 26, Lombard-street, London; Works, Deptford, Kent.

B. and Co. are also Patentees and Manufacturers of Improved Bench and Flooring Cramps for Builders; Wrought Iron Diagonal Gratings, doubly-trapped self-acting Water Closets, and self-acting and self-cleansing Effluvia Traps, for Sewers, Drains, &c. &c.

TO ARCHITECTS, ENGINEERS, AND BUILDERS.

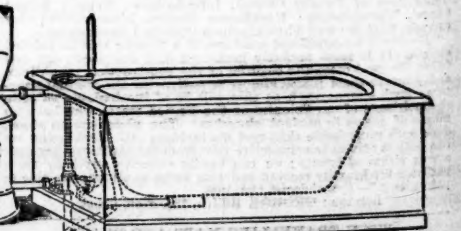
JENNING'S INVENTIONS.

Experience has enabled him to make his

INDIA-RUBBER TUBE COCKS and WATER-CLOSETS

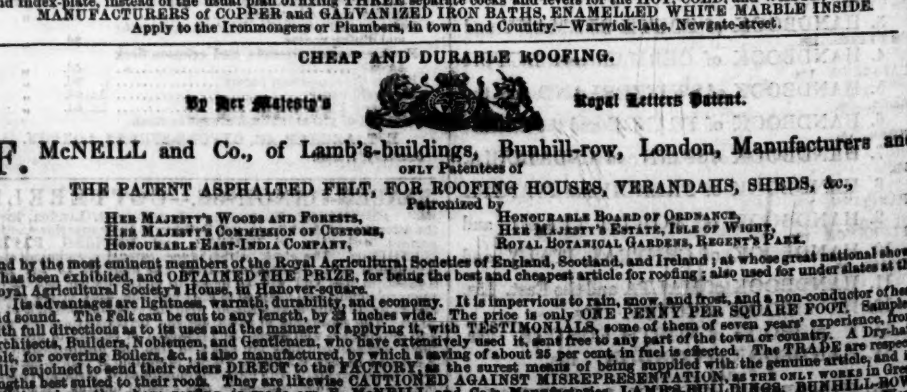
as perfect as possible. References of the highest order as to their efficiency and durability can be given. Fronts secured with

JENNING'S SHUTTER SHOES,



can be referred to in any part of London.

For descriptive drawings, &c., apply to the inventor, 29, Great Charlotte-street, Blackfriars-road.



J. TYLOR and SON'S IMPROVED COPPER CIRCULATING BATH and CONSERVATORY APPARATUS.—The copper boiler is double cased, and answers for the two purposes of BATH and CONSERVATORY—it does not require brickwork—is ECONOMICAL in FUEL and TIME (heating a bath in twenty-five minutes) can be easily detached, and is less in original cost than any other boiler. The bath can be filled with Tylor's three-way cock, with only ONE lever and index-plate, instead of the usual plan of fixing THREE separate cocks and levers for the HOT, COLD, and WASTE, water.

MANUFACTURERS of COPPER and GALVANIZED IRON BATHS, ENAMELLED WHITE MARBLE INSIDE.

Apply to the Ironmongers or Plumbers, in town and Country.—Warwick-lane, Newgate-street.

CHEAP AND DURABLE ROOFING.

By Her Majesty's Royal Letters Patent.

F. McNEILL and Co., of Lamb's-buildings, Bunhill-row, London, Manufacturers and ONLY Patentees of

THE PATENT ASPHALTED FELT, FOR ROOFING HOUSES, VERANDAHS, SHEDS, &c.,

Patronized by

HER MAJESTY'S WOODS AND FORESTS,
HER MAJESTY'S COMMISSION OF CUSTOMS,
HONOURABLE EAST-INDIA COMPANY,
HONOURABLE BOARD OF ORDNANCE,
HER MAJESTY'S ESTATE, ISLE OF WIGHT,
ROYAL BOTANICAL GARDENS, REGENT'S PARK.

And by the most eminent members of the Royal Agricultural Societies of England, Scotland, and Ireland; at whose general shows it has been exhibited, and OBTAINED THE PRIZE, for being the best and cheapest article for roofing; also used for under slates at the Royal Agricultural Society's House, in Hanover-square.

Its advantages are lightness, warmth, durability, and economy. It is impervious to rain, snow, and frost, and a non-conductor of heat and sound. The Felt can be cut to any length, by 32 inches wide. The price is only ONE PENNY PER SQUARE FOOT. Samples, with full directions as to its uses and the manner of applying it, with TESTIMONIALS, some of them of seven years' experience, from Architects, Builders, Noblemen, and Gentlemen, who have extensively used it, sent free to any part of the town or country. A Dry-hair Felt, for covering Boilers, &c., is also manufactured, by which a saving of about 25 per cent. in fuel is effected. The TRADE are respectfully enjoined to send their orders DIRECT to the FACTORY, as the surest means of being supplied with the genuine article, and in lengths best suited to their roofs. They are likewise CAUTIONED AGAINST MISREPRESENTATION, AS THE ONLY WORKS in Great Britain where the above roofing is made are F. McNEILL and Co.'s Manufactories, LAMB'S-BUILDINGS, BUNHILL-ROW.

Roofs covered with the felt to be seen at the Factory, also the new Vice-Chancellor's Courts, the palaces and offices leading to Westminster Hall, and other buildings at the New Houses of Parliament.—A Liberal Discount allowed to the Trade.